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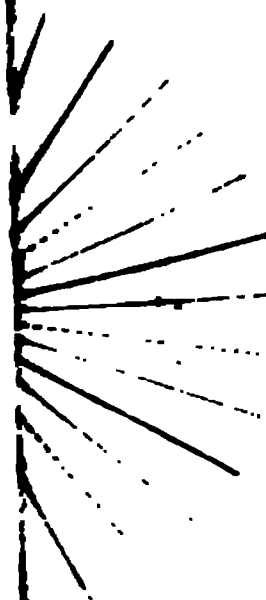
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THE ATLANTIC NAVIGATOR.



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THE
ATLANTIC NAVIGATOR:

BEING A NAUTICAL DESCRIPTION OF THE

COASTS OF FRANCE, SPAIN AND PORTUGAL,

THE

WEST COAST OF AFRICA,

THE

COASTS OF BRAZIL AND PATAGONIA,

THE ISLANDS OF THE

AZORES, MADEIRAS, CANARIES AND CAPE VERDES,

AND OF THE

SHOALS & DANGERS REPORTED TO EXIST IN THE ATLANTIC;

TO THIS IS ADDED

A General Review of the Winds, Tides, Currents, &c.

A DESCRIPTION OF

THE PRINCIPAL HARBOURS ON THE COAST OF NORTH AMERICA,

AND

AN ACCOUNT OF THE MOST ADVANTAGEOUS TRACKS ACROSS THE ATLANTIC.

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**FOURTH EDITION,**

**MATERIALLY IMPROVED AND ENLARGED.**  
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A D D E N D A .

OCTOBER, 1853.

DURING the progress of this work through the press, the following alterations and additions have become requisite.

L'ORIENT.—At this port two small fixed lights were established in 1850, one of which is shown from the little hill of La Periere, and the other from the church; they are both visible about 9 miles.—Page 17.

LA ROCHELLE.—At La Rochelle are two lights (1852). That on the eastern quay (*fanal d' amont*) revolves every 3 minutes, and is visible 10 miles; that on the western quay (*fanal d' aval*), is 257 yards S.E. by E. $\frac{1}{4}$ E. from the former light, and is coloured red.—Page 33.

RIVER GIRONDE.—We have been informed that considerable alterations have recently taken place in the sands and also in the buoyage at the entrance of the river; the assistance of a pilot will, therefore, be imperatively necessary to those who are unacquainted with the navigation. We also avail ourselves of this opportunity to remark, that a pilot should always be obtained for the rivers and harbours of the west coast of France, as since the last survey many important changes are known to have taken place.

A fixed red light, 46 feet above the sea, and visible 7 miles, has recently been established at the distance of 601 yards W. $\frac{1}{4}$ N. from Terre Negre Light. In reference to this light the following is said to be now the course into the river :—"When Coubre Light bears N.N.E., steer for the Cordouan Light until the two Terre Negre Lights come in one, then toward these lights until the Cordouan Light bears S.S.W. when you must steer S.E. $\frac{1}{4}$ S."—(1852.)—Page 35.

FUENTARABIA.—Here a light is shown, but only when the fishermen are at sea. A light is also said to be exhibited at Passage; but of this we are uncertain.—Page 49.

CASTRO URDIALES.—From St. Anne's Castle a light is shown, which flashes red every three minutes, and is visible about 13 miles. Its height above the sea is about 143 feet, and the illuminated arc of the horizon is 270°. To be first exhibited on the 19th of November, 1853.

In the official notice from which the above is copied, it was stated that the rocks on which the hermitage of Santa Anna is erected, extend themselves in a S.E. direction to the distance of 318 feet.—Page 57.

POINT ESTACA.—On this point there is a lighthouse showing a light revolving every minute, at an elevation of 312 feet above the sea, visible 20 miles.—Page 68.

FERROL.—In this harbour a dangerous rock has recently been discovered

(Sept. 1853), which from the bearings we suppose to be on the south side of the channel. "It is named the Cabalino, and lies with the south-east angle of San Felipe Castle N. 71° E.; the south angle of San Carlos Castle N. 14° W.; and the north-west angle of San Martin's Castle N. 85° E. Its distance from the south shore of the channel is not more than half a cable's length. It is nearly circular in form, about 7 feet in diameter, and at low water its summit is awash, though concealed by the seaweed; the depth around it is 9 feet close-to, and increases to 18 feet. At S.E. by E. from the Cabalino, distant 74 yards, is the Cabalo, consisting of three connected masses of rock, the highest and north-westernmost of which is of a tabular form, nearly round, and connected with the Cabalino by a reef. The Cabalo rises 8 feet above the sea, and is nearly 24 feet across, N.W. to S.E.—Page 69.

SISARGAS ISLETS.—On the northernmost projecting peak of Isla Major, the largest of these islands, there is a lighthouse exhibiting a bright light with red flashes every 4 minutes, at an elevation of 363 feet above the sea, visible $3\frac{1}{4}$ leagues.—Page 72.

CAPE FINISTERRE.—On the southern point of the cape there is a lighthouse which shows a light, revolving every half minute, at an elevation of 474 feet above the sea, visible 24 miles.—(Aug., 1853.)—Page 74.

AROSA BAY.—On the south end of Salbora Island there is a lighthouse showing a light varied by red flashes every 2 minutes, which is 83 feet above the level of the sea and can be seen about 16 miles off.

There is also a lighthouse on Cabalo Point, the north-west extremity of Arosa Island, which shows a fixed light visible about 10 miles. This island is within the entrance of the bay.—Page 77.

BAYONNA ISLANDS.—On Mount Faro at the southern extremity of the centre island is a lighthouse, which shows a light, eclipsing every alternate minute, at an elevation of 650 feet (Burgo's measure), so that it ought to be visible about 30 miles.—(Nov. 1853.)—Page 79.

OPORTO.—To run into the harbour a pilot is always necessary. The following signals are now made (Nov. 1849) from a mast with a yard-arm — Page 84.

Two balls at the mast-head.....Keep to the north of the bar.

Three balls at the mast-headKeep to the south of the bar.

Three balls at the right yard-arm12 feet on the bar.

Two balls at the right yard-arm11 feet on the bar.

Two balls at mast-head, and one at
the right yard-arm.....} 10 feet on the bar.

One ball at the right yard-arm9 feet on the bar.

One black ball at mast-head.....{ The coast is dangerous, put
out to sea

One black ball at the mast-head, and
one at the extremity of the right
yard-arm} Vessels in sight cannot be
piloted.

A black ball at each end of yard-arm...{ By coming near you may be
piloted.

A black ball at mast-head, and one on
each yard-arm.....} Make for the bar.

AVEIRO.—The stone pyramids are no longer used to point out the channel over the bar; but at about 900 fathoms east of the bar there is a circular signal-tower, white-washed, the summit of which is about 58 feet above the sea level. We believe, also, that the intention to show a light has been abandoned; it was to have been a revolving light.—Page 87.

ALGECIRAS.—On Verde Island a small fixed light is shown.—(June, 1850.)—Page 111.

MAZAGHAN.—Mr William Falconer says of this bay, in 1839 :—" In the bay there is a dangerous reef which can generally be distinguished, as the sea in fine weather breaks upon it; there is also a dangerous patch of rocks lying W.N.W. from the old light-tower, distant 720 fathoms, upon which the sea breaks at low water during tempestuous weather. The best anchorage is to bring the two flag-staffs on the Sardinian Consul's house in one, and anchor in 5 fathoms water, as by so doing you come upon a patch of blue clay, the rest of the bay being without exception rocky bottom. The prevailing wind is N.E., and when it blows strong a heavy sea tumbles in and renders the bay far from secure. A N.W. wind is also a very unwelcome visitor, but with the wind from any point of the compass from N.E. by E. round to N.W. by W it is always safe.

Provisions and stock of all kinds are very good and cheap. The appearance of the town from the sea is like an old ruined fortification, and the high tower of Tett or Tid to the southward of it, with the town of Azamor to the northward of it, say 7 miles, (the buildings of which are all flat-topped and white-washed), are the only remarkable objects near it.

There is a great deal of sameness in the appearance of the land all the way from Cape Blanco north to Rabat. It is a sterile sandy country of moderate height, with here and there a Mahomedan saint-house."—Page 115.

MOGADOR.—It is frequently the case that vessels bound to this port have too great a tonnage to permit them to anchor safely; the following must, therefore, be attended to. When a red and white flag is hoisted under the national colours at the respective consulates, it will be a signal that there is danger attending the vessel entering the bay, either from its crowded state, or from the fact of the vessel requiring a greater draught of water than the anchorage affords.—(Jan. 27th, 1851.)—Page 117.

CAPE MOUNT.—Commander Forbes, R.N., says, that "between the Sherbro' River and Cape Mount, during the months of May, June, July. and the early part of August, while the S.W. winds prevail, the current runs to the N.W. 2 miles an hour, with a heavy swell tending in shore.

In the latter part of August and September, the winds changing to the N.W. or northward of West, the current turns to the S.E. with a force not exceeding 2 miles and seldom less than one. During the calm months there is but little current if any.

At 200 miles from the coast there is scarcely any perceptible current. At the full of the moon there is frequently a strong tide ripple at night, which comes down with the noise and appearance of breakers."—Page 146.

RIVER BONNY.—We are informed that no ship should anchor off the entrance of this river in $4\frac{1}{2}$ fathoms, and that she will lie in safety only in a depth of not less than $7\frac{1}{2}$ fathoms. The same informant tells us that strangers should not on any account attempt the river, and that *as a rule* all ships, the masters of which have not been on the coast of Africa before, should obtain the assistance of a pilot when running for any anchorage between Mogador and the Bight of Benin, as the sands are apt frequently to shift.—Page 161.

OLD CALABAR RIVER.—To run into this river it is absolutely essential to obtain the assistance of a pilot. Mr. Consul Beecroft says in 1851, "At the entrance there is a knoll of 2 fathoms, which bears South from the south end of Tom Shot's Reef, distant about 2 miles; to avoid it in coming in from the westward, steer East in 8, 9, or 10 fathoms. If the weather is clear so as to see East Head, get it N.E., then steer N. by E. from the ri

of Old Calabar. All the rivers in these bights want surveying. Knolls and sandbanks get up and disappear in two or three years. Breaker Island is larger now, with trees on it."—Page 163.

SIMON'S BAY.—The rock mentioned in the foot-note of page 204 has had a beacon erected on it, with the word "rock," in very legible characters (Sept., 1853).—Page 204.

AZORES.—At Santa Clara Fort, St. Michael's, a lighthouse was said to be building in 1852. We have not heard of it being lighted.—Page 222.

CAPE VERDE'S.—Port Praya, St. Jago, is sometimes difficult to find in consequence of St. Catharine's Peaks being obscured by clouds, Mr Charles Perry gives, therefore, the following directions. "After making the island, being outward bound, steer to the S.W. till the south extreme of the land bears W. by N., when the S.E. point will be distinctly in view, having Red Hill behind upon the same bearing; haul up then to the westward and pass the point at about three-quarters of a mile off, Quail Island (having a black appearance) will then be seen to the N.W., and you should steer up for the north end of it till you fairly open the bay, then luff up to about N.N.W., and anchor midway between Quail Island and the eastern shore of the bay, in 7 fathoms, having Red Hill just open to the northward of the island.—*Nautical Magazine*, Aug., 1853.—Page 281.

ROCKS IN THE NORTH ATLANTIC.—We think that we may now conclude that the Three Chimnies do not exist, although it is stated that they have been seen on more than one occasion, as Lieut. Berryman, of the United States surveying brig Dolphin, in the very position assigned to these dangers, succeeded in getting bottom at a depth of 1900 fathoms, in August, 1853. If these rocks do exist, it is wonderful that they are not frequently seen as they lie in the very track of vessels bound to the northern ports of North America; at any rate we may be sure that they do not exist in the position hitherto assigned to them —Pages 289 and 293.

We may also conclude that the following rocks, Ashton, False Bermudas, Nyes', Vankeulen's vigia, Josyna, Steen Ground, and Maria or Mary's, do not exist, as they were sought for by Lieut. J. C. Walsh, of the U.S. Navy, in 1850, but without success. Lieut. Walsh says, "not one of these rocks was found, nor any indication of their existence; on the contrary, every evidence to disprove it. Our various tracks over and about their reported positions, covering the extent of $1\frac{1}{4}^{\circ}$ of longitude, and 40 miles of latitude, with the many and deep soundings, from 100 to 800 fathoms, without getting bottom, will be found sufficient, I trust, to satisfy navigators that they have no existence—or at least, that those parts of the ocean in which they have been reported to exist, are free from all dangers. To the first three mentioned we gave the most thorough search: to Ashton Rock, six days' time; to the False Bermudas eight days; to Nye's Rock, likewise eight days. All our tracks were by daylight, as the schooner was always hove to at night, while engaged in these explorations. A slight discoloration of water was noticed in the region assigned to Mary's Rock, but no soundings could be got with 500 fathoms. This rock had been previously searched for with like results, by the U.S. Exploring Expedition, Captain Wilkes; and by H.M.S. Levin, Captain Bartholomew. Ashton Rock is placed in a most frequented part of the ocean; there is not a day that some vessel does not pass in the vicinity, and nothing has been seen of it since the first and only report of it in the year 1824. This fact alone should disprove it, independent of our search. There are sufficient real dangers in the Atlantic; these imaginary ones should not disfigure the charts; they only serve to harass navigators, turn vessels from their routes, and thus injure commerce. The reports of them by merchant

vessels, which seldom take time to examine the appearance of such dangers, can readily be explained. Floating wrecks, large trees, carcasses of whales, &c., presenting all the appearance of reefs, have deceived experienced seamen."—Page 289.

Rock N.W. of FINISTERRE—This rock is said to have been again seen on the 26th of January, 1853, by the Russian ship *Dwina*, the master of which reported it to be a rock level with the water lying in lat. $44^{\circ} 43'$ N., and long. $11^{\circ} 22'$ W. In consequence of this report, the French government had instructed one of their steamers, the *Newton*, lying at Lisbon, to proceed to sea in search of it; but with what result we are not informed.—Page 289.

Artkin's Rock.—This rock is reported to have been seen on the 21st of Aug., 1852, in lat. $55^{\circ} 15'$ N., and long. $9^{\circ} 56'$ W., by the officers and crew of the barque *Fingalton*, Captain Craig, of Glasgow, from Quebec to the Clyde. No soundings were given nor was a boat lowered to examine it; we cannot, therefore, think that it exists, especially as it has been repeatedly sought for unsuccessfully,—Pages 289 and 292.

RIO PARA.—To enter and also when leaving the Rio Para, a pilot is absolutely necessary, the changes of the shoals at the entrance being so frequent that no instructions can be of service for any length of time. The same remark also applies to all the harbours and rivers on the north coast of Brazil. The following description of the Rio Para is from Mr Dewey's meteorological journal, kept at Para from 1845 to June, 1849:—

"The latitude of the city of Santa Maria de Belem do Gram Para is $1^{\circ} 28'$ S., and longitude $48^{\circ} 29'$ W. It is situated about 80 miles from the ocean, on the southern mouth of the River Amazonas, this mouth of the river being commonly called the Para River, although it is strictly a part of the great Amazon. The breadth of the river at the city is about 9 miles, and it is studded with innumerable islands, the nearest of which, called *Ilha das Onas*, directly opposite the city, is distant from it 3 miles. These islands form a magnificent basin, which is the harbour of Para. Great changes are constantly occurring in the river, old shoals being washed away and new ones formed. A few years since there existed an island, a few miles below the city, called *Parroquet Island*—this has gone, and vessels of the largest burthen can pass over the spot where it once stood; but, on the other side of the channel, where vessels formerly passed, has, within a few years appeared a large island, already covered with trees of no small size, called "*Ilha Nova*." The tide rises here about eleven feet. The country in this region is low and covered with magnificent forests—indeed, the entire province may be said to be an almost unbroken forest, with underwood of such density, as to render a passage utterly impossible, except by the footpaths of the natives. The birds of this region are of great beauty, and for an ornithologist, this province presents a field of unrivalled richness. The water of the springs is unsurpassed by any in the world; and that of the river is always perfectly fresh, except at high spring-tides, when it becomes rather brackish. The water of the river is exceedingly muddy, but at low tide, springs of water as pure as crystal may be seen gushing from the sands.

Although some distant districts are afflicted, to a great extent, with fever and ague, no place can be found which enjoys a greater exemption from diseases than the city of Para, and the surrounding country; and there is perhaps no place having a greater uniformity of temperature. Situated so near the equator, the changes in the barometer are almost imperceptible—the extreme variations do not amount to over two-tenths of an inch, varying from 29.90 to 30.10. The winds are also very regular; the land breeze generally blowing during the night and morning from south-west to south-east;

and the sea breeze in the afternoon and evening from north to north-east and north-west. 'This wind is here called "Vento de Marajor," or Marajo wind, passing as it does over the great island of Marajo or Joannes.'—Page 329.

ARMACAO.—Lieut. Dalton, R.N., has lately (1852) reported the existence of a dangerous rock off Point Itapacoroya, at the entrance of the anchorage of Armacao, which we believe to be the Armacao near Cape San Thomé, no latitude or longitude being given. "The rock is about 30 feet in extent and is awash at low water. It lies with Point Itapacoroya bearing S.S.W. $\frac{1}{4}$ W.; a small bluff point north of Itapacoroya about 500 yards, S.W. $\frac{1}{4}$ W., one mile; and Feya Island, N.W. by W. $\frac{1}{4}$ W. This island is a good mark for vessels entering or leaving the anchorage of Armacao, as by keeping the island open of Armacao Point, it will lead to a good berth southward of the rock. There are from 5 to $7\frac{1}{2}$ fathoms within 20 yards around it. Between the rock and Point Itapacoroya the depths are 6, $6\frac{1}{2}$, 7, and 8 fathoms, mud, within 50 yards of the point."—Page 362.

CAPE BUSIOS.—A rock was discovered between the Rio das Ostras and Cape Busios, on the 24th April, 1850, by Lieut. Crofton, R.N., who gives for it the following bearings:—high peak of Ancona touching the north-east point of White Island, S. 65° E.; St Anne's Islands, N. 28° E.; centre peak of the high land north of the Rio das Ostras, N. 33° W.; and the north-east point of Fria, S.E. 4° W. (?), one mile. The rock is 20 feet in diameter, and is just awash at low water, having soundings around it of from $7\frac{1}{2}$ to 10 fathoms within the distance of 10 feet. Ancona open to the N.E. of White Island clears it at half a mile to the N.E., in 13 fathoms.—Page 363.

MONTE VIDEO.—The fixed light on the hill has been discontinued, and, in lieu thereof, there is now a revolving light which is visible for 30 seconds during a revolution of 3 minutes. It is 486 feet above the sea and can be seen about 30 miles, in very clear weather.—Page 407.

HOTSPUR SHOAL.—At about 140 miles to the eastward of the Abrolhos Islands, is a shoal of 47 fathoms, discovered by H.M.S. Hotspur in 1814. It is about 15 miles by 10 miles across, consists of coral, and is situated in lat. $17^{\circ} 51'$ S. and long $38^{\circ} 6'$ W.

Montague Shoal.—This is a shoal the centre of which is in lat. $20^{\circ} 46'$ S., and long. $37^{\circ} 47'$ W.; it is about 72 miles long by 12 miles broad, and also consists of coral. On both of these banks (the Hotspur and the Montague), Captain Denham anchored in 1852 for 24 hours at a time, by which the most accurate depths, the set of the current, and specimens of the bottom were obtained. No bottom at 200 fathoms was found between them and the coast, from which the nearest is distant 180 miles.

Captain Denham has made the following report on these banks. "I shaped a course that should test the 47 fathoms, a single sounding laid down from the Hotspur's Remark Book, of 1814, in lat. $17^{\circ} 56'$ S., long. $36^{\circ} 4'$ W.; thence through the position assigned to some 38 fathoms by the Montague, in 1813, lat. $20^{\circ} 9'$ S., long. $38^{\circ} 26'$ W.; and then to trace if any submarine relation thereto could be shown with the bank associated with the names of Pandora, 1847, and John Adams, 1849.

Obtaining quicker soundings as we approached the assigned position of the Hotspur, our casts suddenly jumped from 200 fathoms, no bottom, to 27 fathoms, coral; which being 7 miles in advance of the 47-fathoms spot, at once gave rise to an idea that the bank might cover a considerable space, with perhaps shoaler water. No time was lost in taking up an anchorage upon it. The atmosphere favoured our morning, noon, and evening observations, so that the latitude and longitude were satisfactorily obtained. It blew sufficiently moderate from N.E. to detach the boats, and before the swell disturbed us

we obtained sufficient to show that we had anchored upon a steep-to bank of coralline crust, extending 14 miles, N.W. and S.E., and 10 miles in a N.E. and S.W. direction, with as little as 25 fathoms on the middle of it, and which deepened suddenly from thirty fathoms to seventy, and 200 fathoms, without bottom. We could not detect the slightest current, nor discolouration that would indicate so abrupt a feature in ocean water, by ripple or otherwise. The lead brought up a few specimens, but the dredge and anchor brought up nothing, and the fishing-lines were very successful. We determined the latitude of the N.W. extreme of this bank to be $17^{\circ} 51' 30''$ S., and the longitude, with subsequent rates at Rio, $36^{\circ} 5' 9''$ W., and the variation $6^{\circ} 33' W$.

Pursuing our search for the Montague Shoal, at 9 miles further eastward than it was reported, we struck it in 31 fathoms, from a long line of 180 with the deep-sea lead, and no bottom. We were 48 hours, buffeting with a south-easter before we could obtain an anchor hold of this bank, to which my attention had specially been directed. Eventually, we occupied three positions upon it, the Torch joined us, and we soon traced out a tolerably flat bank of 35 fathoms, bending to the South in its general direction from N.W. to N.E., 72 miles in length and 12 in breadth, with one spot at its N.E. extreme of only 19 fathoms; we found a current to the S.W. of three-quarters of a mile per hour. The same description of fish as on the Hotspur were found on it in abundance. The swabs which we let down on it from different parts of the ship entangled some massive specimens, whilst the crusted surface would yield nothing to the dredge or palm of the anchor. Our observations on this bank place it in lat. $20^{\circ} 45' 8''$ S., longitude, $37^{\circ} 47' 23''$ W.; the variation (also adjusted for change of subsequently ascertained deviation) came out $3^{\circ} 42' W$."—Page 431.

THE ROCCAS OR ROCAS.—These low islands were surveyed in 1852, by Lieut. S. P. Lee, U.S. Navy, who determined the northern point of the northern island to be in lat. $3^{\circ} 50' 56''$ S., and long. $33^{\circ} 49' 24''$ W. They consist of two sandy islands, situated on the western edge of a reef, which extends $1\frac{1}{2}$ mile from east to west, and $1\frac{1}{2}$ mile from north to south, and is covered at high water, with the exception of the islets and some scattered rocks on the southern and eastern sides. The reef is composed of coral, and in its centre is a lagoon, having from 1 to 4 feet water in it at low tide, which appears white from the mast-head at a distance of 4 or 5 miles; in this lagoon there is an abundance of turtle. The reef is in general level, though it has many holes in it, and the scattered rocks are mostly 10 to 15 feet above its surface; one, especially, near its north-eastern edge, being conspicuous, has obtained the name of the Black Rock.

The most dangerous part of the reef appears to be the weather or south-east side, where, if a vessel struck, the chance of saving life would be small. When approaching it from the northward, the breakers will be first seen from aloft at the distance of about 10 miles and soon afterwards the two islands and the Black Rock will appear.

At from one to two miles, N.W. of the northern island, Sand Island, there is very indifferent anchorage in from 15 to 18 fathoms, rocky bottom; rocky bottom also exists at a depth of 15 fathoms, 6 miles east of the reef. At $2\frac{1}{2}$ miles, N.N.E. from the reef, there is no bottom at 30 fathoms, nor at 70 fathoms 4 miles S.W. of it.

The centre of the reef is 84 miles, due West from the peak of Fernando de Noronha; and the variation of the compass is $10^{\circ} 54' W$. There is an abundance of sea-fowl, but no wood or fresh water.—Pages 431 and 434.

TRISTAN D'ACUNHA.—The cliffs of this island are very lofty, and

should not be approached too closely, lest the ship be involved in the eddy winds occasioned by them. There is a depth of 46 fathoms, sand, at about $1\frac{1}{2}$ mile from the shore, abreast of the cottages situated on the tabled tongue of land, immediately under the almost perpendicular side of the mountain, which slopes down to the sea, from an altitude of 8300 feet, on all sides of the island, except this flat space, which forms the north-western projection of the island.

In November, 1852, Captain Denham visited the island, and thus remarks: "Ships are beginning to visit this island, but nothing should induce the commander of a merchant vessel to anchor, even should he do so at the depth of 30 fathoms water, $1\frac{1}{2}$ mile off, with the wind off-shore; the swell which attends the brief calm preceding the change of the wind on shore (North and N.W.), would be very likely to snap his cable, or jerk his anchor home, and he be drifted on the rocky shore. He could not work off, should he slip his cable, and if the on-shore wind proved a gale, he must part from, or founder at, his anchors. The *Julia*, sloop of war, was so caught, parted, and was totally wrecked, with a fearful loss of life, in 1818. But there would be no risk in holding several days' communication by boats, the ship standing off and on, especially if the season happened to be between October and April, which is the summer period here.

The plan of the settlement bay, and to which the residents have given the name of Falmouth Bay, may prove of use to future ships desirous of sighting it to correct their longitude, or to replenish water and stock. But it is dangerous to range along the margins of the island nearer than two miles, on account of the baffling eddies, which leave a ship in the on-set influence of the swell. The settlement bay itself should not be approached within $1\frac{1}{2}$ mile, or in 40 fathoms water, a limit which is denoted by the sail rock off the western cliff closing with the N.W. extreme of the bay and island, and which it does on the bearing of S.W. $\frac{1}{4}$ W. The islanders have no name for the north-western point, where our observations were taken at, so it was named Herald Point.

Keeping the cross marks on of that point and the erect rocky islet at the western extreme, the white cottage brought S.W. by S., (or the low black cliffy point at the eastern extreme of a black pebbly beach bearing south,) is the best line to run in upon, and which should be preserved, whether for sending a boat on shore, while standing off and on, or for anchoring, which a steamer might do with comparative impunity. It must not be forgotten, that excepting the absolute eddy produced by the projections of the island at half a mile off, the current sets north-eastward. It may also be remembered that, although the peak rears its head 8000 feet above the level of the sea, such is the conformation of its slopes, that its apex cannot be seen from the margins of the island, which preclude any vertical angle being measured from the high water mark or cliffs. The peak is of easy access for barometric measurement, but it is generally snow-clad; it was so at the time of this visit, although young summer.

The geographical position of Tristran d'Acunha may now be considered as settled. Its north-west extremity lies in lat. $37^{\circ} 2' 48''$ S., and long. $12^{\circ} 18' 39''$ W., about one-third nearer the Cape of Good Hope than to Cape Horn, and nearly upon a line drawn between those well-known capes, a position which places it 1320 miles southward of St. Helena."—Pages 431 and 453.

FALKLAND ISLANDS.—There has been an alteration in the beacon on Cape Pembroke, the Governor having erected a sort of tower at its base; the base of which is 9 feet square, tapering to 5 feet square, and 36 feet

high : above it is a topmast 30 feet high. The beacon from base to top is now 65 or 70 feet high, so that it can be seen in clear weather 10 miles off.—(May, 1850.)—Page 466.

Port Stanley.—Mr Thomas Surfle, R.N., has given the following instructions for vessels going into Port Stanley :—“ Ships coming in from the southward and making Cape Pembroke, will see a flag-staff about two miles inland, near to the settlement, on a rising ground, upon which an union-jack is hoisted when a ship heaves in sight ; there is also a large beacon on the pitch of the cape. Should it be blowing hard from the southward when you enter Port William, you may run for Sparrow Cove, as should your vessel be in distress it is quite safe : water and fresh beef can be procured here. If going into Stanley Harbour you will see a large finger-post on the west point of Sparrow Cove, and another on the east point of the entrance to the harbour, both pointing to the harbour. Should a pilot not come off, a ship need not wait ; the soundings are good, only keep well clear of the kelp,—there is not the least danger. In sailing in from the northward, after you pass Berkeley Sound, you may keep close to the kelp all the way ; there is not the least danger outside ; it is as good a pilot as you can have. The anchorage is good all over Port William, and you may anchor close to the entrance of Stanley Harbour should the wind be blowing out.”—Page 466.

TRACKS ACROSS THE ATLANTIC.—CAPE VERDE ISLANDS TO THE SOUTH-WEST COAST OF AFRICA.—The following remarks are by Lieutenant W. C. B. S. Porter, of the United States Navy, May 17th, 1851 :—

“ In the season of February, March, April, and May, there is no difficulty in making the passage from Porto Praya to Ambriz in 30 days, provided the run from Porto Praya to Monrovia takes not more than 8 days.

The direct route, and that which approaches the great circle, leads along the coast, touching the outer soundings of St. Anne's Shoals, thence to Half-Cape Mount, to allow for a current when steering for Monrovia. From thence, follow the coast along with the land and sea breezes, assisted by the current, until you arrive at Cape Palmas ; keep upon the starboard tack notwithstanding the wind may head you inshore, (the land breezes will carry you off,) and as the wind permits, haul up for 2° West longitude ; cross the equator here if convenient, but I would not recommend going to the westward of it, you will encounter westerly currents of from 30 to 50 miles a-day. In the vicinity of Prince's Island the S.W. wind is always strong. In the latitude of about 1° 30' N. there is a westerly current. Should it not be practicable to weather the island of St. Thomas, stand on, approach the coast, and you will meet with north winds to carry you directly down the coast. Our Salem vessels make the passage from the United States in 56 days, arriving at Ambriz in May. I have made three different cruizes to this coast in the same season, in the vessels Marion, John Adams, and Perry.

The impulsive desire to attain the object of our duty will, as much in nautical matters as others, mislead our better judgment, when there is a prospect, or any temptation to success, without experience to forewarn us. Thus, our vessels, after arriving at Cape Palmas, have generally gone upon the port tack, because the wind carried them towards the coast or Gulf of Guinea, and seemed to favour them for the port tack the most ; which, on the contrary, although slowly veering towards the S.E., was hauling more ahead, and leading them off into a current, which, under a heavy press, it is impossible to work against. The consequences were, they had to go upon the starboard tack, and retrace the ground gone over. On the starboard tack, as you proceed easterly, the action of the wind is the reverse, and it allows you to pursue the great-circle course.

It employed the Marion 80 odd days to Cabenda, a port 200 miles nearer than Ambriz; to which port (Ambriz) from Monrovia, in this vessel (the Perry) we went in 23—making 31 from Porto Praya. In the John Adams, 10 to Monrovia, and 46 to Ambriz, by the way of Prince's Island; about 10 of which was lost working to the south of Cape Palmas. From Cape Palmas to the point of crossing the equator the current is easterly—south of that westerly.

The practice along the coast in this vessel (the Perry) was, to keep near enough to the land to have the advantage of a land and sea breeze, and to drop a kedge whenever it fell calm, or, we were unable to stem the current. Upon this part of the coast near the Congo, the lead line does not always show the direction of the current which affects the vessel. On the bottom there is a current in an opposite direction from the surface; therefore, before dropping the kedge, the better way is to lower a boat and anchor her—which will show the drift of the vessel. Between Ambriz and the Congo, I have seen the under current so strong to the S.E., as to carry a 24-pound lead off the bottom, while the vessel was riding to a strong S.W. current—but the under current is the strongest.

In crossing the Congo, I would always suggest crossing close to its mouth, night or day; going North with the wind W.N.W., steer N.N.E., with a five or six knot breeze, when you strike soundings on the other side you will have made about a N. $\frac{1}{4}$ E. course in the distance of 9 miles, by log from $11\frac{1}{2}$ fathoms off Shark Point. The current out of the river runs West about 2 knots an hour. With the land breeze it is equally convenient, and may be crossed in two hours. In coming from the north, with Cabenda bearing N.E., in 13 fathoms, or from the latitude of $5^{\circ} 48'$ —wind S.W., a S.S.E. course will carry you over in four hours outside of Point Padron, and by keeping along shore the current will assist you in going to the South. Vessels which cross to seaward from latitude $5^{\circ} 45'$ and long. 9° W., are generally six days or more to Ambriz; by the former method it occupied us (the Perry) only two days."—Page 481.

ST. JOHN'S.—Off the entrance to this port, a large iron fog-bell has lately been placed. It lies in $7\frac{1}{2}$ fathoms with Cape Spencer bearing S. 59° E.; Cape Mispick S. 62° E. $3\frac{1}{4}$ miles; Partridge Lighthouse, N. 21° E. $1\frac{1}{4}$ mile; Sheldon Point N. 49° W. $1\frac{1}{4}$ miles; Medginish south-east point N. 76° W. 2 miles; Cape Negro, red mark, S. 81° W. $4\frac{1}{4}$ miles; and Cape Split S. 78° W. The height of the bell above the water is 19 feet.—Page 498.

CHARLESTON.—To enter this harbour the assistance of a pilot is imperative. Attempts are now being made (June, 1853) to improve the navigation by deepening the channel.—Page 516.

P R E F A C E .

SINCE the first publication of this work great accessions have been made to our knowledge of the hydrography of the Atlantic, and it has been our object in every successive edition to avail ourselves of such sources of information as may enable us to present as correct a work as its nature will admit. With this view, much of the present edition has been entirely rewritten,—particularly the sections on the detached islands of the Azores, Canaries, &c.; and the whole has been remodelled and revised, so as to embody, if possible, all the information we at present possess on the Atlantic.

During the last few years, the coasts of the Atlantic, more or less, have been surveyed, and, with the exception perhaps of that of Southern Africa, but little remains to be accomplished. Most of the detached islands have also been examined, and the American government are now engaged in an elaborate survey of the whole surface of the Atlantic, for the purpose of recording the direction and force of the currents, the prevailing winds, height and strength of the tides, &c., which when completed will be of the greatest value to commerce, as it will, in all probability, present much shorter routes across the ocean than have hitherto been adopted; as it is, much benefit has already resulted from only a partial examination. This examination is under the superintendence of Lieut. Maury of the U.S. Navy, who is so well known for his excellent Wind and Current Charts. As a result of this examination many of the *vigia* or rocks, reported in various parts of the Atlantic, are proved to have no existence whatever; bottom has been obtained in various places at a depth of 2000 to 3000 fathoms, while in one place, lat. $31^{\circ} 59' N.$ and long. $58^{\circ} 43' W.$, no ground was reached with a line of the length of ~~5000~~ fathoms or nearly $6\frac{1}{2}$ miles; and a branch or off-set from the Gulf Stream has been discovered as far east as long. $72^{\circ} 10' W.$ in a latitude so far to the southward as $33^{\circ} 20' N.$, this was met with when searching unsuccessfully for the Ashton Rock. But, while the American Government has been so active, our own has been no less so, as the islands of the Azores, Madeira, and Canaries have for the first time been thoroughly examined by Captain A. T. E. Vidal, and a survey of the coast of Guinea, in continuation of that carried on by Captains Owen, Arlett, and Vidal, in 1838, has been completed by Captain Denham. The French Government have also carried on a survey of the north coast of Brazil, in the vicinity of Para, and of French Guayana, which was entrusted to M. Tardy de Montravel, and completed in 1844, so that these coasts are now laid down with some pretensions to accuracy.

By these various surveys we have been enabled materially to improve the present edition; but in a work of this kind we are well aware that perfection cannot be obtained, the changes which are continually taking place in the

direction and shape of shoals, whether caused by storms or otherwise, render such impossible. This work is not therefore presented as an absolute guide to the mariner, to supersede the assistance of a pilot when one can be obtained; but is offered as *an aid* when, from circumstances, the assistance of local knowledge is not accessible. It must be remembered that no sailing directions for any length of time can be correct—the very nature of shoals and sands forbids it; a good chart and pilot should always, therefore, as a rule be obtained, but, when such are not to hand, this work may then be of service, and as it is our wish that it should be made as accurate as possible, *we invite communications* from those who may be able to render such, assuring them that any remarks which may tend to its improvement will be most gratefully accepted.

It only remains for us to add, that in the description of the coasts of France, Spain, and Portugal, we have availed ourselves of the excellent works of Le Saulnier de Vauhelle, Tofino, and Franzini; and of the coast of Africa, of the surveys of Captains Owen and Vidal, and the *Manuel de la navigation à la cote occidentale d'Afrique*, by M. Charles P. de Kerhallet, of the French Navy. Various other authorities are mentioned in the body of the work, and much excellent information has been furnished by private friends. To the pages of the excellent periodical, the *Nautical Magazine*, acknowledgment is due for many extracts, and much invaluable matter has also been derived from the Journals of the Royal Geographical Society.

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THE ATLANTIC NAVIGATOR.

THROUGHOUT THIS WORK THE BEARINGS AND COURSES ARE ALL BY COMPASS, UNLESS WHERE OTHERWISE EXPRESSED; BUT THOSE GIVEN THUS [E.N.E.], SIGNIFY THE TRUE. THE GIVEN DEPTHS ARE THOSE AT LOW WATER SPRING TIDES. THE DISTANCES ARE IN NAUTICAL MILES OF 60 TO A DEGREE. THE DIRECTIONS OF THE WINDS, TIDES AND CURRENTS ARE ALWAYS TO BE UNDERSTOOD AS THE TRUE. IN THE BAY OF BISCAY THE VARIATION OF THE COMPASS IS ABOUT $2\frac{1}{4}$ POINTS WESTERLY.

IT HAS RECENTLY BEEN ORDERED BY THE LORDS COMMISSIONERS OF THE ADMIRALTY THAT THE WORD "PORT" IS TO BE SUBSTITUTED FOR THE WORD "LARBOARD" IN ALL H.M. SHIPS OR VESSELS, ON ACCOUNT OF THE MISTAKES WHICH FREQUENTLY OCCUR FROM THE SIMILARITY OF THE TERMS STARBOARD AND LARBOARD.

In our Sailing Directions for the English Channel, the Coasts of England and France have been minutely described, and consequently to repeat the description would not be consistent with the limits of the present work. But as it is possible that a ship may be driven, by stress of weather, into the BAY OF BISCAY, a few remarks on its harbours may not be misplaced.

SECTION I.

THE COASTS OF FRANCE, SPAIN, AND PORTUGAL.

USHANT TO SOCOA.

USHANT or OUESSANT is an irregular craggy island, about 4 miles in length from east to west, and 2 miles in breadth. On the south-western side of the island is Lampaul Bay, a harbour frequented only by the French, and difficult to navigate. At the entrance of the bay, between the rocks on either side, are soundings of 40 fathoms, with a bottom of rock and small shells, thence decreasing gradually to 5 and 6 fathoms at the head of the bay. In the middle of the bay is a rock called La Corcé, which is always above water, and has a clear passage on either side of it. But this place is difficult to get into on account of the dangerous reefs which extend off this end of the island, drying in some places, but always breaking when there is any sea. The Jument Rock, the southernmost of the rocky ridge on this side of the island, dries 19 feet at low water: it lies about W.S.W. from the island, distant rather more

than a mile, with Bélengar Mills open 2° to the right of the La Corcé Rock. On the opposite side of Lampaul Bay a rocky ledge extends some distance from the land, and dries in several places. The outermost rock of this ledge is named Leurvas Rock, and is 4 feet above the sea at low water. There are many other rocks on the eastern side of the island, so that in using the Fromveur Channel, it is necessary to give the island a good berth in order to avoid them.

On the northern side of the island are two bays, frequented only by the native vessels, which occasionally anchor here. The most eastern one, named Stiff Bay, is dangerous, on account of several rocky ledges in it, and is quite open to gales from the north-east. The other bay on the western side of the island is called Beninou Bay, and is well sheltered to the westward by a small island named Keller; here small vessels may anchor in 8½ to 12 fathoms, sand and rocky bottom, and ride secure from all winds except those from the northward.

The lighthouse on the north-eastern end of the island shows an excellent fixed light, at 272 feet above the sea, visible in clear weather to the distance of 6 leagues. Its position is lat. 48° 28' 31" N., and long. 5° 3' 17" W.

The magnetic bearings from different parts of the English Coast are as follow :—

	MILES.
From St. Catharine's Point in the Isle of Wight.....	W.S.W. ¼ W. ....192
From the Bill of Portland	S.W. by W. ¼ W. ...157
From the Start Point	S.W. ¼ W. ....117
From the Eddystone Lighthouse	S.W. ¼ S. ....106
From the Lizard Lights	S.S.W. 89
From the Scilly Light.....	S. ¼ E..... 97

The same bearings from the west side of Ushant to different points southward are :—

	MILES.
To the Passage du Raz	S. ¼ E..... 27
To the west end of the Chaussée de Sein.....	S. by W. ¼ W..... 24
To Gijon	S.S.W. ¼ W. ....296
To Cape Penas	S.S.W. ¼ W. ....288
To Cape Ortegal	S.W. ¼ W. ....303
To Cape Finisterre	S.W. ¼ W. ....372

From Keller Island a rocky ledge extends 1½ mile to the westward, and dries in various places. Its outermost ledge, named the Basse Callet, has 11 fathoms on it, with 37 to 40 fathoms close-to; but immediately within it is much shoaler water, so that no attempt must be made to go within it and the island, and vessels in approaching this part of Ushant would do well not to go nearer the lighthouse than 4½ and 5 miles. The marks for the Basse Callet are the lighthouse in one with the centre of Keller Island and the Bélanger Mills in one with the western part of Callet Rock.

Nearly 2½ miles to the south-westward of the Jument Rock on the southern side of Lampaul Bay, is Ushant Bank, a shoal about 1½ miles long and half a mile broad, on which are 26 to 32 fathoms, bottom of broken shells. Around it on all sides are 50 to 60 fathoms, with the same description of bottom, and between it and Ushant are 50 to 26 fathoms.

The tide flows at Ushant, on the days of full and change, at 3 h. 46 min.; springs rise 21 feet, and on the coast to the eastward 24 to 26 feet. In the offing the stream continues to run for 3 hours after the time of high water. *In the Passage du Four the tides set strongly, the flood northward and the ebb southward, but between the Ile de Bas and Ushant the same tides set*

eastward and westward. The variation of the compass here is $25^{\circ} 15'$ W.

The space to the south-westward of Ushant, between it and St. Matthew's Point, is thickly besprinkled with craggy and rocky islets, having numerous channels among them. Of these channels or passages, those most frequently used are the Fromveur Channel and the Chenal du Four.

THE FROMVEUR CHANNEL, immediately to the eastward of Ushant, is about $1\frac{1}{2}$ mile wide, and has a depth of 25 to 33 fathoms. Here the tide runs very rapidly, generally exceeding 4 knots; so that the passage must be considered as dangerous, and only to be used in cases of necessity, and then only with the tide. The course through is about E. by N. and W. by S. The northern side of the channel is bounded by a reef of rocks, showing in many places at low water, which line the shore of Ushant, and extend from it to the distance of about a mile. Coming through the channel from the northwards, the first rock met with on the eastern side of the channel will be the Loédoc, always above water, and at a short distance to the west of this is another named Men Tensel, which dries 13 feet, the two rocks being connected by a rocky ledge mostly under water. A little to the south of this is a group of rocks named the Bannec, dry at all times; and there are several other dangers still farther to the southward.

Les Pierres Vertes, or the Green Stones, is the south-western patch of the group of islets and rocks between Ushant and the main. It is a patch of sunken rocks which become dry in several places at low tide, at that time appearing about 7 feet above the surface of the water; its marks are Ar Men Guen Gondichoc Rock seen between the barracks and semaphore on Molene Island, bearing E. by S. a little southerly, and Bannec Rock N E. $\frac{1}{4}$ E. To the south-eastward of this, about 4 miles, is another patch of rock named the Cleu Basseven, and about $1\frac{1}{2}$ miles farther on is the Buffalo, a sunken rock having but 2 feet on it, upon which H.M.'s ship Magnificent was unfortunately wrecked in 1804. Near the Buffalo are the Pierres Noires, or Black Rocks, which are always above water, and have 17 to 15 fathoms close to them. From the Pierres Noires a ledge of rocks, of which some are above and some under water, extends to the eastward almost to St. Matthew's Point, and is named the Chaussée des Pierres Noires. The most prominent of this ledge are named the Chimnies, le Ranvel, Basse Large, &c. But the whole group of islets and rocks to the eastward of Ushant will be better understood by an inspection of the chart, than by any description of them that we could give.

Many of the Black Rocks' group dry at low tide, and are so steep, that the soundings along them, at no great distance, vary from 48 to 32 fathoms. At the distance of about 5 miles to the southward of them there is good anchorage, with easterly winds, in 35 fathoms, fine sand; and at 6 miles distance, the depths are from 45 to 40 fathoms, with sand, and nearly the same thence to the southward.

THE PASSAGE DU FOUR is the channel between this group and the shore. In coming from the northward, the first rock met with is the Four or Oven, so named from its appearance to an oven; it is a large black rock always above water, lying about a mile from the French Coast, and E. $\frac{1}{4}$ S., 11 miles, from Ushant Lighthouse, and appears very conspicuous when leaving the Isle of Ushant to sail to Brest. About a mile to the westward of the Four is a small patch of $5\frac{1}{2}$ to 6 fathoms, named the Basse Boureau, lying with Landunevès Church in one with the southern part of the Isle de Jock, and St. Matthew's Point seen open $17'$ to the right of Point de Corsen; between this patch and the Four Rock are from 12 to 22 fathoms. Nearly $2\frac{1}{2}$ miles to the W. by S. $\frac{1}{4}$ S. of the Four Rock is a dangerous shoal named the Basse Meur, of which the exact soundings are not known, but the depth around it is from

28 to 35 fathoms; it lies with St. Matthew's Lighthouse appearing between the peninsula of Kermorvan and Kermorvan Point, and Landunevès Mill in one with a rock close to the shore named Little Melgorne. Within Basse Meur Rock, and close to the shore, are a number of dangerous reefs, of which some appear just above the water at low tide, but as they are out of the track of vessels we shall not attempt to describe them.

On the opposite side of the Passage du Four are several dangerous ledges, the outermost of which is the Basse St. Charles, a small patch of 7 fathoms, lying $2\frac{1}{2}$ miles from the Basse Meur; it lies with Ploumoguier Church in line with a small rock close to the shore named the Goaltack, and has around it a depth of 12 to 25 fathoms; bottom of sand, rock, and broken shells. About three-quarters of a mile to the south-eastward of this is the Basse St. Louis, a patch having no more than $2\frac{1}{2}$ fathoms upon it, with similar soundings close to; its marks are Portzpoder Church open a little to the right of the Great Liniou Rock, and La Helle Rock open 38' to the left of Molene Island. A short distance to the southwestward of this is another patch of $7\frac{1}{2}$ fathoms.

To the S. by E. $\frac{1}{2}$ E., about $1\frac{1}{2}$ mile, from the Basse St. Louis, and about midway between the shore and the Plateau de la Helle is a bank of rocks about three-quarters of a mile in extent, named the Platresses. Several heads of rocks appear at low tide, at which time they are from 1 to 12 feet above the surface. The mark that clears them to the northward is Plouarzel Church appearing between the Fourches Rocks bearing S.E. by E. $\frac{1}{2}$ E.; and to the southward, the ruins of Trezien Mill in one with Goaltack Rock bearing E. by S. $\frac{1}{2}$ S. This rocky bank is situated on the western side of the Four Channel, and between it and the shore are several shoal patches of from $1\frac{1}{2}$ to 4 fathoms. The northernmost of these dangers named La Valbelle, a small rock of 10 feet water, lies with Plouarzel Church seen between the Fourches Rocks; and the southernmost, a patch of 8 feet, named the Tendoc, lies with the Trezien Mill in one with Goaltack Rock.

In sailing through the Passage du Four, the leading-mark is St. Matthew's Lighthouse in one with the extremity of Kermorvan Point, but it is necessary to follow this very strictly, especially when near the Platresses, the passage between this rocky bank and La Valbelle being but little more than half a mile wide. In going through from the southward the soundings will be 8 to 10 fathoms increasing in depth as you proceed.

To the westward of the Platresses, about half-way between them and the islands south of Ushant, is a high rock, named La Helle, which appears like a ship under sail. This rock is situated upon an extensive bank of the same name, which is dangerous throughout its extent, as many heads of the rocks appear just above the surface when the tide is down. The passage between this bank and the Platresses is about $1\frac{1}{2}$ mile wide and has from $8\frac{1}{2}$ to 26 fathoms in it, upon a very irregular rocky bottom.

Between La Helle Bank and the islands to the south-west, there is no safe passage which can be used by a stranger, on account of the numerous rocks that lie about.

The coast on the eastern side of the Passage du Four is extremely irregular, and bordered with numerous ledges and rocky patches, which would render an approach to it very dangerous. Near the Four Rock, and immediately behind Ichock Islet, is the small village of Argenton with its dry sandy cove; and at three-quarters of a mile more to the south-westward is the village of Portzpoder, the approaches to both places being encumbered with rocks. At $2\frac{1}{2}$ miles further on in the same direction, following the line of coast, is the *inlet of Laberildut, which dries at low water.* It is frequented only by small

vessels, which run in, with the steeple of Lanildut, at the head of the inlet, in one with the spire of Brélès, situated farther in the country; and when they have the entrance open they steer direct for a rock at the mouth of the inlet, and bear up towards the village.

About $6\frac{1}{4}$ miles to the southward of Lanildut, and $2\frac{1}{4}$ miles to the northward of St. Matthew's Lighthouse is Kermorvan Point, on which there is a lighthouse, showing a fixed light at 72 feet above the sea, visible about 12 miles in clear weather. If kept in one with the light on St. Matthew's Point, it will lead through the Passage du Four.

Immediately to the northward of Kermorvan Point is the Bay of Blanc Sablon, where there is anchorage in 4 to $7\frac{1}{4}$ fathoms water, sandy bottom. Kermorvan Point is rocky, and a short distance off it are two rocks named Le Normand and Petite Vinotière which appear only at low water. Another rock named the Grande Vinotière lies in the middle of the Passage du Four at three-quarters of a mile from the point; it shows only at low water, at which time it is 9 feet above the surface, so that in sailing through the channel caution is requisite to avoid it.

Conquet Haven is just under Kermorvan Point, at 2 miles to the northward of St. Matthew's Point. It is dry at low water, and rocky ledges extend out from both sides of the entrance. On the south side are the Renards Rocks, which are about a quarter of a mile west of the semaphore, and appear at low water. To sail into the haven proceed carefully in mid-channel that you may not run on these dangers.

In turning to windward, hereabout, you may stand to the eastward until St. Matthew's Abbey comes a capstan-bar's length open to the eastward of the Little Valley, and to the westward, until St. Matthew's Point comes a little open of the point of Conquet Haven. Endeavour not to bring the former 2 ship's length open of the latter point, for should you do so, you will be close to the rocks and banks which lie to the westward of the channel.

ST. MATTHEW'S POINT is distinguished by a lighthouse which exhibits a revolving or intermitting light at 177 feet above the sea. The building is 82 feet high and shows the light to the distance of 18 miles. The flashes succeed each other every half minute, but the eclipses do not appear total when within 7 or 8 miles. The importance of this light will be evident upon an inspection of the chart, as by a single bearing of it, the ship's position may be determined, and a course thence steered for Brest Harbour.

A small bank, of 5 to 8 feet, named Basse du Chenal lies $1\frac{1}{4}$ mile, W. $\frac{1}{4}$ S., from the lighthouse, on the western side of the Passage du Four. Its mark is Kermorvan Point in one with Portzmoguer Sands, and around it on all sides is deep water. At three-quarters of a mile to the westward of it are some rocks above water named the Bossemens.

Around St. Matthew's Point a ledge of rocks extends some little distance out, and about half a mile to the eastward of the lighthouse, are some rocks above water, named the Rospects, which run out full half a mile from the shore in a south-westerly direction. Close to them there is deep water, so that in rounding the point some little caution is necessary to avoid them. Another patch of rocks, named the Vieux Moines or Old Monks, lies half a mile from the lighthouse, with that building bearing N.E. $\frac{1}{4}$ E. They are above the surface only at low water, at which time they show about 23 feet in height. Between them and the shore are $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms, but outside the depth increases to 10 and 12 fathoms.

From the lighthouse the coast continues in an E. by S. $\frac{1}{4}$ S. direction, about $2\frac{1}{4}$ miles, to Point Crearc'h-meur, the western side of the Bay of Bertheaume, and upon which there is a fort and beacon. Midway, at three-

quarters of a mile from the land, is a rock that uncovers at low water, named the Coq, which lies with the beacon near Fort St. Merzan bearing N.N.W., and Bertheaume Castle in one with the extremity of Point Crearc'h-meur. Between this rock and the land are 8 and 10 fathoms, and a safe passage by keeping near the shore, but it is more usual to sail outside it, as less danger is incurred.

About $1\frac{1}{2}$ mile, in an E.S.E. direction, from the Coq Rock is a bank of 5 feet at low water, named the Beuzec; all around is deep water of 8 to 10 fathoms, so that it is extremely dangerous for large vessels. The marks to know it are, when a tower on the shore at the Cove of Bertheaume is brought to bear north of a similar tower on a small island at the west point of Bertheaume, and you also have two small towers on the east points of the Great Cove of Bertheaume together, you will be upon the Beuzec Bank, and the Castle of Bertheaume will bear N.N.E. $\frac{1}{4}$ E. from you, distant a mile; but if these marks are not brought together at the same time, you will pass clear of it.

The anchorage in the road of Bertheaume is in 8, 10, and 12 fathoms, sand and mud. Ships in this road are sheltered from the N.N.E. and N.W. winds. This is commonly named the outer anchorage. But a good mark to avoid the Coq and Beuzec Rocks, passing to the southward of them, is, the lighthouses on the points of Petit Minou and Portzic in one, which will carry you past them, clear of all danger.

BREST HARBOUR.—The approach to the Goulet of Brest is bounded on the south side by an extensive group of rocks and shoals, having amongst them numerous passages, which can be navigated only by those well acquainted. The outermost of these dangers is La Vendrée Rock, a small patch of 6 feet water, which lies with the two peaks of the Siège Rock (in the Ushant group) open a little to the right of the Chimnies Rocks, bearing N.N.W., and the tower of Crozon open 9' to the left of the Fourche Rock, E.S.E. $\frac{1}{4}$ S.. From this rock foul ground of 15 to 16 fathoms extends in a westerly direction about one mile. On all sides of this rocky bank are 20 to 30 fathoms, so that the greatest caution is necessary to avoid it. About half a mile to the E.S.E. of the shoal part of this rocky bank is a small patch of 5 fathoms, named the Goémant; and at three-quarters of a mile N.E. by E. $\frac{1}{4}$ E. from the same shallow part is another patch of similar depth, named the Astrolabe. The rocks named the Parquettes are situated to the E. of La Vendrée about 2 miles, and bear from St. Matthew's Lighthouse S. $\frac{1}{4}$ W., $4\frac{1}{2}$ miles; they dry at low water, and appear at that time about 20 feet above the surface. Around them there is deep water.

The southernmost of this group of rocks is the Basse de l'Iroise, which is a shoal bank of 4 fathoms, lying $2\frac{1}{2}$ miles to the S.S.W. $\frac{1}{4}$ W. of La Vendrée. Its marks are Locrist Mill open 3' or 4' to the right of the Chapel of Notre Dame de Grace de St. Matthew; Roscanvel Mill, or Kelernn Peninsula, in one with the most northerly rock off Point Toulinguet; and Landsmarc'h Point in one with the summit of Ménéhon Mountain. To the eastward of this rocky bank, between it and the shore, are numerous other dangers, the position of which will be best seen upon a reference to the chart.

Upon the point of Petit Minou, on the northern side of the Goulet of Brest, has been erected a lighthouse, which exhibits a fixed light at 105 feet above the sea; and another lighthouse has been erected on the point of Portzic, which shows a light revolving every 3 minutes, each flash being preceded and followed by short eclipses, but which do not appear total within the distance of 8 miles. If these lights are kept in one, they will lead to the entrance of Brest Channel, clear of the Coq and Basse Beuzec on the north, and the Ven-

drée, Parquetes, &c., on the south side. Or, if in the day-time, you will pass to the southward of the Coq, by steering about S.E. from St. Matthew's Point, taking care to keep the north end of the isle of Beniguet open with it, until the mill upon the land to the northward bears N. by W., and the trees N., when you will have passed the rock. The Beuzec may be passed on either side; but the best way is to run to the northward of it, and along shore, at the distance of two cables' length from the latter, and thus sailing S.E. by E. $\frac{1}{4}$ E. across the entrance of the Bay of Bertheaume. In approaching the Goulet, be careful to avoid the Fillettes, Mengam, and other rocks, which lie in mid-channel, off the peninsula of Camaret; and carefully avoid also the Bagine or Kergutio Rocks, lying near the entrance of Brest Water, at about two cables' length from the north shore. Vessels may pass on either side of them, but the common passage is to the northward. When the town of Brest appears open of Portzic Point, you may steer for it, and anchor in 8 or 9 fathoms, or more to the southward, in 15 or 10 fathoms.

BREST, the principal station of the French navy, is situated partly on the slope of a hill on the north side of what may be considered one of the finest harbours in Europe. The town is not large, but is compactly built, and regularly fortified. The harbour consists of a large land-locked bay upwards of 20 miles in circumference, with two deep branches, the one of which receives the river of Landerneau, and the other the river of Aulne. It has but one narrow entrance defended by strong forts on both sides, and the interior is also commanded by formidable batteries. The water is deep enough for the largest vessels, and there is room sufficient for 500 sail of large ships to ride securely. The basin is 5 or 6 miles across, and the principal anchorage is about a mile from the town. A magnificent arsenal, the vast building slips, magazines and workshops, the barracks, built upon a long esplanade, are the principal buildings. The town is separated from the suburb of *Recouvrance* by a deep tide inlet, along side of which is the dockyard. There is also a *bagne* situated on the top of a hill, a large building sufficient to contain 4000 convicts. Brest is also the seat of one of the maritime prefects. It was but a fishing village till 1631, since which time it has risen to be a large and populous town. Besides the ordinary or civil population, there are about 3000 workmen attached to the dockyard, 2500 convicts, and a garrison of 4000 men.*

CAMARET.—The south side of the Goulet of Brest is formed by the peninsula of Kelernn, which is pretty bold and clear of all danger. Upon it there are several forts, which guard the approach to Brest. From hence the coast bends to the southward, forming the Bay of Camaret, in which vessels may ride in 8 and 10 fathoms, on a muddy bottom, sheltered from E.S.E., South, and S.W. winds. Here is also a small harbour, which dries at low water, and can therefore be frequented only by small craft, which lie sheltered from all winds.

About 2 miles to the westward of Camaret Bay is Point Toulinguet, upon which there are several batteries, and a lighthouse showing a fixed red light at 161 feet above the level of the sea, visible about 9 miles in clear weather. A ledge of rocks surrounds the point on every side, and extends out about a cable's length; and in a N.N.W. $\frac{1}{4}$ W. direction from the point there are

* In July, 1846, a notice was issued from the British Consulate, to the effect that all vessels entering Brest Roads are to steer for the guard-ship, which is the outermost anchored ship, and is known by having a white-and-blue broad pendant at the fore, and by her having jury-masts. The ship coming in is hailed by the guard-ship, and told where to anchor. A yellow flag is sent on board, and must be kept flying until the ship is released from quarantine by an officer of the Board of Health, whose boat comes off from Brest as soon as possible.

several rocky islets and other dangers, separated from each other by narrow channels. The largest of these rocky islets is named the Toulinguet, and is always above water, but a rocky ledge extends from it to the south-westward about a quarter of a mile, which is uncovered only when the tide is down. You may sail through the passage between this rock and the shore in from 4 to $4\frac{1}{2}$ fathoms, by keeping in about mid-channel, but being careful to approach nearer the rock than the shore; and you may also pass to the westward of the rock, through the Passage du Petit Léac'h, by keeping the summit of the Paris Road, over Brest, exactly in the middle of the Goulet, which will carry you to the northward of the Pélen Rocks, between them and the Petit Léac'h Rock, upon which is a beacon, in from $7\frac{1}{2}$ to 14 fathoms, rocky bottom.

About $1\frac{1}{2}$ mile to the southward of Toulinguet Point is Pen-hir Point, which is steep and rocky, and has 5 or 6 large rocks, named Les Tas de Pois, extending off to the south-westward nearly three-quarters of a mile. These rocks are always above water, and are steep-to on all sides. From these rocky islets the coast bends to the E.S.E., and runs in that direction about $2\frac{1}{2}$ miles to the small sandy bay of Dinant, in which are $6\frac{1}{2}$ to $3\frac{1}{2}$ fathoms, shoaling gradually as you approach the head of the bay. The coast then trends to the southward, about $4\frac{1}{2}$ miles, to Point la Chèvre, which is forked and makes in two points, and has some small rocks about it, and a sandy spit of $3\frac{1}{2}$ to 6 fathoms running out above a mile into the sea, in a W. by S. $\frac{1}{2}$ S. direction.

There are several dangerous rocks in your way from Dinant Bay to Point la Chèvre, which lie more or less at a distance from the shore. In a W. $\frac{1}{2}$ N. direction, distant $1\frac{1}{2}$ mile, from Point Dinant, is a small rock which appears only at low water, named La Chèvre; and in the same direction, but three-quarters of a mile farther out, is Le Chevreau, another rocky spot, covered every tide: between and round these dangers are 11 and 12 fathoms water, rocky ground. At $2\frac{1}{2}$ miles, N.W. by N., from Point la Chèvre, is a rock, named Le Bouc, which appears at every low tide; and W.N.W. $\frac{1}{2}$ W., distant a mile, from Le Bouc, is the Basse du Bouc, a knoll with 6 fathoms on it, which lies with Le Bouc Rock and the Islet of Guénéron in a line, bearing E.S.E. $\frac{1}{2}$ E. The Islet Guénéron is small, and surrounded with a rocky ledge: it lies close to the shore at about $1\frac{1}{2}$ mile to the northward of Point la Chèvre, and has deep water close to it on all sides, but no passage between it and the main.

DOUARNENEZ BAY lies immediately to the eastward of Point la Chèvre, and is exceedingly capacious and commodious, having a very wide entrance, and ground so clear as well as such regular soundings, as to require no leading-mark, and, if a proper berth is given to the rocks laid down in the chart, no danger can be incurred.

At the entrance of the bay and nearly $2\frac{1}{2}$ miles, W.S.W. $\frac{1}{2}$ S., from Point la Chèvre, is a rock, named the Basse Vieille, which is above the surface of the water only at low tide, at that time appearing about 5 feet in height. It is steep-to on all sides, and at half a mile from it are 10 to 17 fathoms, so that in entering the bay considerable caution is necessary to avoid it. It lies with the following marks: the westernmost of the rocks named the Tas de Pois in one with the western part of Toulinguet Islet, and the Men-cos Rock off the eastern part of Point la Chèvre in one with Kidizient Mill bearing E. by N. $\frac{1}{2}$ N.

The course from a position of about two miles off the south-western part of Ushant Island to the entrance of this bay will be S.S.E. $\frac{1}{2}$ E., 9 or 10 leagues. There will be nothing in the way to take your vessel up, until you arrive at the Basse Vieille, which you may avoid by observing a clump of trees, with a *little chapel in the midst*, which stand on the north side to the eastward of

Point la Chèvre, having a windmill to the westward, and two to the eastward. When the windmill next to the eastward of these trees comes just open of Point la Chèvre, you will have passed the rock, and may steer for what part of the bay you please, all being fair and clear, excepting what may be seen above water, and what may be near the shore. The best ground is, however, considered to be that toward the north side of the bay, the bottom being of clear sand, in a depth of from 9 to 15 fathoms. The general depths over the bay are from 18 to 12 fathoms, and all, as before observed, is clean ground.

From Point la Chèvre the bay runs in to the eastward for an extent of about 4 leagues, and has a general breadth of full 6 miles. In the northern part of the bay there are several spots of rocky and foul ground, some of which appear above water, but they all have deep water about them of $4\frac{1}{2}$ to 8 fathoms, so that vessels frequenting the anchorage in this part of the bay will have to take precaution that they may avoid them. The outermost of these rocky patches is La Pierre Profonde, which is a small rock always above water; and a little to the northward of this is Le Taureau, covered at high tide; and about half a mile to the eastward of these is Les Verrés, to the northward of which, and near the land, is the Laber Rock. A little to the northward of Le Taureau is Le Rip, a knoll, of 5 fathoms water; and nearer to the coast is another spot, with only 22 feet. Within these is the Cove of Morgat, adjacent to the town of Crozon, which is distinguished by a high black tower.

If bound to Douarnenez, the best course will be to the southward of La Vieille Rock, as you may steer towards the town without any impediment whatever until past Point Leide, to the eastward of which are two small sandbanks, named Basse Meur and Basse Neuve, the former having 17 or 18 feet water over it, the latter 8 and 9 feet: by keeping out a mile from the land, you will avoid both. You will find good anchorage, in 6 or 5 fathoms water, opposite to the town, or still less depth as you near the land.

From Douarnenez the coast runs in a westerly direction to Point le Van, a distance of about 16 miles, the coast between being high and steep, having several steep points projecting into the sea, which are dangerous to approach being surrounded with rocks. The depths between vary from 22 to 25 fathoms, fine sand the greater part of the way, but changing to rocky bottom on advancing westerly.

Point le Van has numerous rocks and rocky patches about it, which extend in a westerly direction from it about one mile. At a mile, N.E., from the point, is a rock named Basse Jaune, which dries 2 feet in height when the tide is down; it is surrounded with a bank of $7\frac{1}{2}$ to 10 fathoms, and lies with Le Chlec Rock in one with the extremity of the Bec du Raz. Between it and the shore are 18 to 20 fathoms, but no attempt should be made to pass between, as it is rocky about Point le Van.

From Point le Van the coast bends round to the westward to the Bec du Raz, a distance of $1\frac{1}{2}$ mile, and forms the small bay of Trépassés, in which are soundings of 16 to 4 fathoms, shoaling gradually upon a bottom of fine grey sand.

THE ILE DE SEIN or SAINTS is a low flat island lying $4\frac{1}{2}$ miles, W.N.W., from the Bec du Raz, being separated from it by a channel of 15 to 18 fathoms, sandy bottom*. The Bec du Raz must have a good berth given it, as several rocks lie to the W.N.W. of it, of which the highest is called the

* At the north-eastern part of the island is a small harbour frequented by the coasting vessels, which anchor in safety on a bottom of gravelly mud. The harbour is dry at low water, and there are several ledges of rock to be avoided when entering; so that none but those well acquainted can run for this place.

Vielle, or Old Woman, and is the furthestmost from the land; near this, at about half a cable's length distance, is a rock under water, named La Platta.

The western side of the Passage du Raz is boundnd by a ridge of rocks, which extends a considerable distance from the island, named the Pont des Chats or Cat's Bridge. Some of these rocks uncover at low tide, and the easternmost one bears from La Vielle nearly west, distant 2 miles; consequently, in using this channel, considerable caution is necessary not to approach the island too closely.

To the N.N.W. of the Bec du Raz is a bank of rocks, which divides the northern entrance of the Raz Passage into two channels. The largest of these islets or rocks is named the Trevennec, and appears very conspicuous, as it is high and can be seen at a considerable distance. It bears from the Ile de Sein E.N.E. $\frac{1}{2}$ E., distant $2\frac{1}{2}$ miles, and is surrounded by rocks principally under water, so that in going through the channel great caution is necessary to avoid them, more particularly as the stream sets over them with considerable force; for it is to be observed that here the tides run very strongly, the flood to the northward and the ebb to the southward. It is high water, on the days of full and change, at $3\frac{1}{2}$ h.

THE CHAUSSEE DE SEIN is that dangerous ridge of rocks which extends in a N.W. $\frac{1}{2}$ W. direction, for a distance of 9 miles, from the great island. Many of the rocks dry at low water, but should not be approached too near, as little or no warning is given by the lead, there being from 30 to 45 fathoms within a mile of them on a bottom of rock and broken shells. The most dangerous part of the Chaussée is that nearest the Ile de Sein, where for about a space of about $4\frac{1}{2}$ miles the ridge is studded with rocks more or less above water, and which takes the name of Pont de Sein or Saint's Bridge. The outermost point of the Chaussée de Sein bears from St. Matthew's Point Lighthouse W.S.W. $\frac{1}{2}$ S., distant 21 miles, and from the south-eastern point of Ushant S. by W. $\frac{1}{2}$ W., distant $24\frac{1}{2}$ miles.

When sailing in the vicinity of this dangerous reef of rocks the greatest circumspection will be necessary, and a near approach should not be made unless you have on board a good pilot from the Ile de Sein, as it is possible that all the dangers may not yet have been discovered.

Between the Saints and the group of islets and rocks in the space within Ushant, is the channel named the Iroise, in which is a depth of 50 to 30 fathoms, soundings of sand, rock, and putrid shells. There the flood runs to the N.W. and the ebb to the S.E.; and it is high water at 4h. to $4\frac{1}{2}$ h.

The lighthouse erected on the northern point of the Ile de Sein shows a flashing or intermitting light of the first order, which appears at an elevation of 148 feet above the level of high water. The flashes appear every four minutes, being preceded and followed by short eclipses, which, however, are not total within the distance of 10 miles. The weaker light, which continues about three minutes, between the flashes, is visible in clear weather at a distance of 6 leagues.

A lighthouse also stands on the highest part of the Bec du Raz, which shows a fixed light at 259 feet above the level of high water. In clear weather it may be seen 6 leagues off.

The Sein light is $5\frac{1}{2}$ sea miles from the Bec du Raz light, on the bearing of N. 86° $50'$ W. This bearing, which is likewise the general direction of the whole chain of rocks named the Chaussée de Sein, passes about 4 cables' length to the southward of the north-western extreme of the chain, which is 9 miles from the Sein light, and $14\frac{1}{2}$ miles from that on the Bec du Raz.

In approaching these rocks from the westward, the first light seen will be *the flashing light on the Ile de Sein*, and a single bearing of it will indicate

to the mariner whether he is to the northward or southward of the line of direction of the two lights. In clear weather the Bec du Raz light will not be seen till the vessel is within 4 or 5 miles of the western extreme of the chain of rocks.

When it is intended to pass to the southward of the rocks, a course should be steered so as to open the light on the Bec du Raz to the right, or southward of that on the Île de Sein. But if it be intended to pass to the northward, or to enter the Iroise, no time should be lost in quickly opening the Bec du Raz light to the left or northward of that on the Île de Sein.

The Île de Sein light bears a good resemblance to the Penfret light (on one of the Glénan islands) but this resemblance cannot occasion any mistake, as the light of Penfret is within the horizon of the great light of Penmark, the flashes of which are at half minute intervals, and which, in fine weather, are seen as far as the Bec du Raz.

In sailing through the Passage du Raz from the southward, the Trevennec may be passed on either side, but the Eastern Channel is considered the best, although the other, with a scant wind, gives a ship the advantage of laying through with tacking, and the stream within it is weaker.

About $3\frac{1}{2}$ miles, S. by W., from the western extremity of the Chaussée is a small patch of 19 fathoms, named Fouquet Bank, from the name of the pilot who discovered it. It is of a very small extent, but has deep water of 25 to 30 fathoms close-to, with soundings of rock and small shells. The sea breaks on it occasionally, but never so violently as on the Chaussée de Sein.

About 2 leagues to the S.E. of the Bec du Raz is a small bay named Port Cabestan, but it is a by-place, so that vessels very rarely anchor here, only running for it in cases of necessity. The entrance to the road is between rocks which dry at low water.

From the Bec du Raz the land trends to the S.S.E. a distance of 20 miles to Penmark Point, the coast bending in and forming an extensive bay named Audierne Bay, in which are soundings of from 20 to 6 fathoms. In the northern part of the bay is a cluster of shallow patches of 2 to $4\frac{1}{2}$ fathoms, with 8 to 9 fathoms between them and the shore, and 13 to 14 fathoms close-to, outside. The shallowest of these patches, named Les Ninkinou, lies opposite Plougof Church, at about $1\frac{1}{2}$ mile from the land, with the Bec du Raz lighthouse bearing N. by W. $\frac{1}{4}$ W., distant 3 miles.

Nearly 7 miles from the Bec du Raz is the small harbour of Audierne, which can be entered at high water only, but vessels when inside may lie sheltered from all winds. Before it is the rocky bank of La Gamelle, situated about a mile from the shore, on either side of which vessels may safely pass, by keeping near the land. Between this bank and the shore, on both sides, are several sunken rocks. It is high water here, on the days of full and change, at 4 o'clock.

From Audierne the land is high until within a few miles of Penmark Point, when it sinks into a valley, in which are a village and several churches. At three-quarters of a mile, S.S.W., from the town are a number of rocks, of which some are always above water. On the land side of them are some channels, which can be used by boats and small vessels, but the navigation of them is very difficult, and only known to the fishermen of the coast.

Just round to the northward of Penmark Point is the small bay of La Torche, in the lower part of which, at a place named Portz-carne, vessels of moderate size can take the ground without risk, when embayed in the Bay of Audierne and unable to double the rocks of Penmark, or to keep the sea. From hence to the River of Pont l'Abbé, the shore is bordered by rocks, which extend out nearly a league from the land, so that in running along the coast it will al-

ways be necessary to give it a wide berth. These rocks have deep water close to them, there being near to their outer edge a depth of 20 to 30 fathoms, sand, gravel, and shells; but in coming from the westward, you will be clear of all danger from them, when Beuzec Church comes in one with the signal-post house in Forest Bay.

The lighthouse on Penmark Point stands near the church of St. Pierre, and shows a revolving light of the first-class, the eclipses of which take place at half-minute intervals. It is 135 feet above the sea, and visible 22 miles. In ordinary weather, the eclipses do not appear total within the distance of 3 leagues.

About 10 miles to the eastward of Penmark Point is Benodet Bay, in which are soundings of 4 to 9 fathoms; but the place is so besprinkled with dangers, that when bound to any of the places within the bay, a pilot becomes indispensable.

On the west side of the bay is the little river of Du Pont l'Abbé, which is accessible only at high water, being barred with banks, through which is a small navigable channel at high tide. When within the entrance the channel deepens, and small vessels may ride at anchor under shelter of the small island of Tudy, and opposite the village of Loctudy.

QUIMPER RIVER lies about 3 miles to the eastward of the River Pont l'Abbé, there being several dangerous rocks between that must be carefully avoided, and a strand of sand lines the shore, and extends some considerable distance into the sea. The entrance of the river is of considerable breadth, and has a moderate depth of water, there being at low tide from $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms in the fairway. On each side of the entrance there is a battery, and a rocky ledge extends from the shore on either side a short distance out. There are also two small rocky shoals in the middle of the entrance named Les Verres and Le Four, and near the western point of the river is another named La Rousse, all of which dry at low water. It is high water here, on the days of full and change, at about half-past 3 or 4 o'clock.

On Point du Coq, a short distance within the entrance, is a fixed red light, at 33 feet above the sea, visible 11 miles; and, at 291 yards, N. 14° W., from this is another fixed light, but of the ordinary colour: this is 56 feet above the sea, and can be seen 13 miles.

The mark for anchoring in Benodet Bay is the eastern point of Penanguern Rock, situated a little eastward of Mouton's Isle, in one with the lighthouse on Penfret Island bearing S. by E. $\frac{1}{4}$ E. In steering from hence to the entrance of the river, caution is necessary to avoid the Mats, Taro,* and other dangers which lie about a mile from the eastern shore. The mark to run into the river is the two lighthouses on Point du Coq in one, which will lead up in mid-channel between the Verres and Four Rocks and the rocky ledge, named the Rousse, in from 6 to $4\frac{1}{2}$ fathoms. When approaching Fort du Coq, you steer up the river in mid-channel, and anchor before the town of Benodet in from 5 to 7 fathoms, sand and mud with a little gravel.

CONCARNEAU.—About 6 miles to the eastward of Benodet is Forest Bay, the land between being bordered by shoals and rocks, many of which appear at low tide; it therefore is necessary to be very cautious when navigating this part. On the western side of Forest Bay is Beg-meil Point, distinguished by a battery and signal-post, off which a rocky ledge extends about three-quarters of a mile, and on the opposite side is Fort Cabellou, with several dangerous ledges close-to. Forest Bay has a great many shoals in it, with several rocks

* The marks for this rock are Tregune Church in one with Point Mousterlin, and Benodet Church in one with Fort du Coq. This latter mark also clears, to the westward, the dangerous rocks which extend nearly 2 miles to the southward of Mousterlin Point.

above water, but afford shelter to vessels well acquainted with the coast, which anchor in 5 to $6\frac{1}{2}$ fathoms, muddy bottom.

The harbour of Concarneau is on the eastern side of the bay, near Fort Cabellou. The entrance is strewn with rocks, upon one of which, named Le Cochon, there is a beacon. Most of these dangers dry at low water, and then appear from 1 to 16 feet above the surface of the sea, but there are some patches which at that time have not more than 2 to 5 feet over them. The Men-Cren is a rock which never covers, and is situated on the west side of the channel-way into the harbour; to the eastward of this is the road, and here small vessels lie in 5 to $6\frac{1}{2}$ fathoms, sand, mud, and shells.

Two fixed lights have been established at this port. One is shown from Fort La Croix at 46 feet above the sea, and can be seen 9 miles off. The other is situated between Concarneau and Beuzec, at 2052 yards, N.N.E. $\frac{1}{4}$ E., from the former, and is 177 feet above the sea, and can be seen at the distance of 12 miles.

In coming from the southward, after passing the Basse Jaune Bank, care is necessary to avoid the Corven de Trevignon, Les Soldats, and other dangers off Point Trevignon. It is recommended to keep the lead going, and to preserve a depth of 17 to 16 fathoms, shoaling gradually to 12 and 11 fathoms as you approach the port, on account of these dangers being all steep-to, and but few of them appearing above the surface of the water, except at low tide, when Les Soldats, Flaharn, and others, uncover: the bottom is generally green mud and clay. To sail into the harbour in the day-time, bring Beuzec Church exactly in one with Concarneau Church, and in the night-time bring the two lights in one with each other; which marks lead in, in the best water, between the rocky patches named Lue-vras, Men-Cren on the one side, the Men-fall, Barzic, Cochon on the other side. When close to the Men-Cren you must bear up towards the Mill du Bois, and steer into the port, avoiding the rocks close to the jetty-head.

At $1\frac{1}{4}$ mile to the southward of Fort Cabellou is Point Jument, which is rocky to some little distance off. About half a mile from the point, there is an extensive flat of $3\frac{1}{2}$ to 7 fathoms, with several shoal spots upon it of $\frac{1}{4}$ to 3 fathoms. The outermost of these patches is named the Corven, and has $2\frac{1}{2}$ fathoms upon it at low water. From hence to Point Trevignon, the distance is $3\frac{1}{2}$ miles in a south-easterly direction, the coast being bordered all the way by dangerous shoals. This point is distinguished by a fort and a signal-house. The outermost of the rocks, named the Corven de Trevignon, lies $1\frac{1}{4}$ mile from the point, with St. Philibert Church bearing E.N.E. $\frac{1}{4}$ E., distant $2\frac{1}{2}$ miles. A short distance from this rock is the Flaharn, which dries; and to the north of the Flaharn is an extensive group of rocks, which show at low water, named the Soldats.

From Point Trevignon the coast runs easterly about 5 miles to the entrance of the small rivers Aven and Belon. About midway there is a small island, at a mile from the shore, named Verte, or Green Island; and within this there is another, named Raguenés, close to the land. There are also numerous dangerous patches, which would render a near approach to the shore imprudent. Before the entrance of the rivers there are two rocky ledges, named Les Verres and Le Cochon, which dry at low water, and also a bank of $3\frac{1}{2}$ fathoms, named Le Trepied; so that in making the entrance you must steer so as to leave these on your starboard side. The passage in is in 8 to 10 fathoms water, decreasing as you advance; and when you get between the points of the river, you will have 3 to $2\frac{1}{2}$ fathoms; or, in coming from the eastward, you can enter the rivers by keeping near the shore, there being 3 to $4\frac{1}{2}$ fathoms all the way; but both rivers are shallow and barred.

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CONCARNEAU.—About 6 miles to the eastward of Benodet is Forest Bay, the land between being bordered by shoals and rocks, many of which appear at low tide; it therefore is necessary to be very cautious when navigating this part. On the western side of Forest Bay is Beg-meil Point, distinguished by a battery and signal-post, off which a rocky ledge extends about three-quarters of a mile, and on the opposite side is Fort Cabellou, with several dangerous ledges close-to. Forest Bay has a great many shoals in it, with several rocks

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above water, but afford shelter to vessels well acquainted with the coast, which anchor in 5 to $6\frac{1}{2}$ fathoms, muddy bottom.

The harbour of Concarneau is on the eastern side of the bay, near Fort Cabellou. The entrance is strewn with rocks, upon one of which, named Le Cochon, there is a beacon. Most of these dangers dry at low water, and then appear from 1 to 16 feet above the surface of the sea, but there are some patches which at that time have not more than 2 to 5 feet over them. The Men-Cren is a rock which never covers, and is situated on the west side of the channel-way into the harbour; to the eastward of this is the road, and here small vessels lie in 5 to $6\frac{1}{2}$ fathoms, sand, mud, and shells.

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At $1\frac{1}{2}$ mile to the southward of Fort Cabellou is Point Jument, which is rocky to some little distance off. About half a mile from the point, there is an extensive flat of $3\frac{1}{2}$ to 7 fathoms, with several shoal spots upon it of $\frac{1}{2}$ to 3 fathoms. The outermost of these patches is named the Corven, and has $2\frac{1}{2}$ fathoms upon it at low water. From hence to Point Trevignon, the distance is $3\frac{1}{2}$ miles in a south-easterly direction, the coast being bordered all the way by dangerous shoals. This point is distinguished by a fort and a signal-house. The outermost of the rocks, named the Corven de Trevignon, lies $1\frac{1}{2}$ mile from the point, with St. Philibert Church bearing E.N.E. $\frac{1}{2}$ E., distant $2\frac{1}{2}$ miles. A short distance from this rock is the Flaharn, which dries; and to the north of the Flaharn is an extensive group of rocks, which show at low water, named the Soldats.

From Point Trevignon the coast runs easterly about 5 miles to the entrance of the small rivers Aven and Belon. About midway there is a small island, at a mile from the shore, named Verte, or Green Island; and within this there is another, named Raguénès, close to the land. There are also numerous dangerous patches, which would render a near approach to the shore imprudent. Before the entrance of the rivers there are two rocky ledges, named Les Verres and Le Cochon, which dry at low water, and also a bank of $3\frac{1}{2}$ fathoms, named Le Trepied; so that in making the entrance you must steer so as to leave these on your starboard side. The passage in is in 8 to 10 fathoms water, decreasing as you advance; and when you get between the points of the river, you will have 3 to $2\frac{1}{2}$ fathoms; or, in coming from the eastward, you can enter the rivers by keeping near the shore, there being 3 to $4\frac{1}{2}$ fathoms all the way; but both rivers are shallow and barred.

About $2\frac{1}{4}$ miles to the southward of these rivers is Beg Meg Point, close to which are some rocks which dry, named Les Cochons. Immediately to the eastward of this point is a small place named Port Brigneau, with rocks on each side of the entrance; and three-quarters of a mile further on is another place named Port Meryen, the entrance to which is also rocky. A little more than a mile from Port Meryen there is a signal-house; and at the distance of $1\frac{1}{4}$ mile from the same place is a creek named Port de Douelah. From hence to the little River Quimperlé the distance is 3 miles. The entrance of the river is narrow and shallow, but when within it deepens; and the small town is about 7 miles from the entrance. Here a considerable trade is carried on.

From Quimperlé the coast turns to the southward, forming the small Bay of Pouldu. The soundings in the bay are generally 10 fathoms, decreasing gradually as you approach the river, before the entrance of which there are but $2\frac{1}{4}$ at low water. At the entrance of the river there are also some rocky ledges, which dry 4 feet at low tide. From Quimperlé River to Talut Point the distance is $5\frac{1}{4}$ miles, with some extensive rocky patches about midway, which must be carefully avoided; it is therefore recommended not to go within 2 miles of the coast. Many of these patches dry, and upon one of them near the shore is a small fortress, named Fort de Kergan. From this fortress to Talut Point the coast is rocky all the way to some little distance out, and should not, therefore, be approached too near. From Talut Point the coast runs easterly about 3 miles, to the entrance of Port Louis, and is rocky all the way.

THE GLENAN ISLANDS are an extensive group of islands and rocks, situated to the south of Benodet Bay. The largest and principal islands are named Penfret, St. Nicholas, Loch, Drenec, and Castle-bras; and between them are numerous channels, well known to the fishermen of the neighbourhood. Upon Cygogne Island, the centre of the cluster, is a fortress, which is said to be bomb-proof. It is well secured, as it is entirely surrounded by water, which is in many places so shallow that a man may cross on foot to the islands in the vicinity. Within the islands there is no anchorage or passage unless for very small vessels, and these will lie within reach of shot from the fort.

The largest and most easterly island of the group is Penfret Island, which is nearly a mile in length, being low in the middle, but rising at its extremities so as to form two hills. It is cultivated, and supplied with excellent water. On the northern point of the island is a lighthouse, which exhibits an intermitting light, flashing every 4 minutes. The light is 72 feet above the ground, and 118 feet above the level of high water. Bright flashes regularly succeed each other every 4 minutes, and last about 8 or 10 seconds. The faint light, which is perceptible during the intervals, is preceded and followed by short eclipses, and may be seen in clear weather 5 leagues off. On both sides of the island are fine sandy bays, and boats may always land to leeward.

The northern side of the Glenan Islands is, in general, pretty clear, as you may sail near the largest of the group, and anchor in 9 and 10 fathoms; but this must not be attempted by strangers, as there are many rocks about.

* There is but little apparent difference between this light and that near Noirmoustier Island, on the Pillier, in lat. 47 deg. 2 min. 26 sec. N., long. 2 deg. 21 min. 32 sec. W.; but there is no danger of mistaking one for the other, as it is not possible for any vessel from seaward to arrive in sight of Penfret light, without having previously seen either the light of Belle Island or that of Penmark; and when approaching the Chaussée de Sein, there are visible at the same time the flashing light on the Ile de Sein and the fixed light on the Bec du Raz.

To the E. and N.E. of Penfret Island, on which side it is steep-to and free from danger, there is excellent anchorage in from 15 to 20 fathoms, muddy bottom, at the distance of from 1 to $2\frac{1}{2}$ miles. Here ships may lie well sheltered from the W., S.W., N.W., N., and N.E. winds, being exposed only to those from between the E. and S., and in that direction the shoals of Basse Jaune, &c., reduce the force of the sea.

In the winter, the safest anchorage is well to the northward, with the flag-staff of the fort bearing W.S.W., and the north hill on Penfret S. by E. $\frac{1}{2}$ E., about 2 miles distant, in 16 fathoms water, good holding-ground. If a situation nearer the island be preferable, for the purpose of watering, the flag-staff may be brought on with the extreme northern part of Penfret, bearing W. $\frac{1}{2}$ N., and the rocks, which are to the S.E. of Penfret, S. by E. $\frac{1}{2}$ E. This spot is about 1 mile from the island; depth, 15 fathoms, good ground, but more exposed than the former during S.E. or southerly gales.

A little to the north of the Glenan Islands is a rocky bank named the Pourceaux. Many heads of the rocks appear above water. To the north of the Pourceaux Rocks are the Mouton or Sheep's Island and Bank; and to the westward of this group, towards Benodet Bay, are a number of dangerous shoals and rocks, some of which appear at low tide.

The passage between the Glenan Islands and the Pourceaux Bank, is about three-quarters of a mile wide, and has soundings in it of from 10 to 14 fathoms, sand, mud, and clay. To sail through it, you bring the outer rock, which lies E. $\frac{1}{2}$ N., distant a full half mile, from St. Nicholas Island, on with the north point of Penfret Island, and sail on thus until Cygogne Fort flag-staff comes just open of St. Nicholas Island; then steer directly E., which will carry you into 14 and 15 fathoms water, where you may anchor.

The southernmost cluster of rocks of the Glenan group, is the Jument, which is a reef of half a mile in extent, the eastern part of which is the shoalest, and has over it not more than 2 or 3 feet of water. The depth increases quickly to the southward, for at the distance of half a mile are 22 to 24 fathoms; but, on the north side, and clear of the shoal, there are overfalls of 5 and 7 fathoms, and probably of a less depth. On the shoalest part, St. Philibert's Church appears on with the low south point of Penfret, bearing N.E. by E. $\frac{1}{2}$ E.; the flag-staff of Fort Cygogne on with the middle of the low flat island, or rather nearest to its western end, N.E. $\frac{1}{2}$ N., and the western rocks N. $\frac{1}{2}$ W., $2\frac{1}{2}$ miles from the flat island.

At the distance of a league to the eastward of the Jument Rock, is a small reef named Basse an Ero, which is not so extensive as the former. At low ebbs, a small part of it is even with the water. About it there is shoal water of 5 to 7 fathoms. On its shoalest part, the highest of the rocks, S.E. from Penfret, about 3° open of the N.E. part of that isle, bears N. $\frac{1}{2}$ E.; the upper part of a remarkable peaked rock, which is seen just over the south point of the flat island, N.W. $\frac{1}{2}$ N., close to the south of a large black rock, which is about half-way to the island. The Basse an Ero is nearly $2\frac{1}{2}$ miles from Penfret.

About $1\frac{1}{2}$ mile to the southward of the Basse an Ero, are some patches of from 5 to 10 fathoms, named the Laouenou. Close to these small shoals are 10 to 17 fathoms, and to the eastward and southward of them, at the distance of half a mile, are 20 to 30 fathoms.

At rather more than 2 miles to the eastward of the Glenan group is an extensive bank of 8 to 15 fathoms, named the Basse Jaune. On the eastern side of this bank is a cluster of shoal spots with 6 to 4 feet on them; one of them also dries. The marks for this dry rock are, Cygogne Fort open $50'$ to the left of Castel Raet Rock, and the western part of the summit of Locrenan

Mountain, at the bottom of Forest Bay, on with the eastern slope of Beg-meil high land bearing N. $\frac{1}{2}$ W. Another mark that has been given for these patches is, the little Men-du Rock, a little to the westward of St. Philibert's Church, and on with some blue-slatted houses. These blue-slatted houses will then appear on with the centre of the small sandy bay which is immediately to the eastward of the fort on Trevignon Point.

The Pignon is a small rock of $5\frac{1}{2}$ fathoms, situate upon the Basse Jaune Bank. Around it are irregular soundings and a rocky bottom. It lies nearly E.S.E. from the middle of Penfret Island, distant 3 miles, with the church of Tregune on with Menhuelon Wood, which lies further inland, and Vaux Glenan Island in one with Castel Raet Rock, the small rock in the middle of the sandy Bay of Penfret.

The mark to sail between the Glenan Islands and the Basse Jaune Bank, is Mouton Island open a little to the north of the north point of Penfret Island, which will lead through in the deepest water, in from 25 to 15 fathoms, sand, mud, gravel, and rocky soundings. It is high water at the Glenan Islands, on the days of full and change, at 3h. 26m. The eastern or flood tide usually runs about an hour longer, where it is uninterrupted. Vertical rise, 12 to 18 feet. Velocity, $\frac{1}{2}$ to 2 miles.

According to M. Beauteemps Beaupré's charts, there is a small shoal of $9\frac{1}{2}$ fathoms, lying about $3\frac{1}{2}$ miles to the eastward of the Basse Jaune Rock. It is named the Basse Doun, and has 25 to 15 fathoms a short distance from it on all sides. Its position is in the line of direction in which is seen Fort Cygogne open 50' to the left of Castel Raet Rock.

THE ILE DE GROIX lies about 6 leagues to the S.E. by E. of the Glenan Islands, and nearly 3 miles from the main-land. The island is about 4 miles long, and $1\frac{1}{2}$ mile broad, lying in a S.E. by E. and N.W. by W. direction. It is defended by batteries, and is distinguished by its lighthouses.

The coasts of the island are clean all round, the eastern and south-eastern sides excepted, from which rocky reefs extend some considerable distance. The reef extending from the eastern extremity of the island, runs out from the island nearly half a mile. It is named the Basses Milit, and dries in many places at low tide. Close to these rocks are 9 to 13 fathoms, so that great caution is necessary to avoid them. The reef at the south-eastern end of the island is named Les Chats. It is situated at the extremity of a rocky reef which extends to the distance of nearly a mile from Point des Chats, and frequently dries at low water. No passage must be attempted between this rock and the shore, as such an attempt would undoubtedly prove fatal, there being numerous ledges in the way, which appear when the tide is out. Nearly a mile westward of the Chats, in the direction of Point d'Enfer, there are also some shallow spots which must be avoided.

A small shoal of 12 feet, named the Basse des Chats, and by the English, the Venerable Rock, lies S. by E., distant $1\frac{1}{2}$ mile, from the Point des Chats. Its marks are, Point d'Enfer and Point St. Nicholas, the southern extremities of the island in one, and Point L'Orient tower in one with the citadel of Port Louis. There is a small patch of 4 fathoms a little to the north-westward of this rock, but in every other part between the Venerable Rock and Les Chats ridge there is deep water. It is recommended, however, that in approaching Point L'Orient, you keep outside the rock.

The northern side of the Ile de Groix is bordered with a bank of 7 to 15 fathoms, sand, mud, and gravel. It is named the Basse des Bretons, and extends about half-way over the north approach to L'Orient Harbour. When bound to Port L'Orient, and sailing to the north of the Ile de Groix, it is requisite to give the northern side of the channel a good berth, on account of

a dangerous rocky ledge named the Grasu, which lies full half a mile from the shore. The whole extent of the northern side of the channel from Point Talut to L'Orient Harbour is rocky, and should not be approached too closely until the entrance of the river has been made.

On Pen-men Point, the north-western extremity of the island, there is a lighthouse which exhibits a fixed light at the height of 75 feet from the ground, and 194 feet above the level of high water. If the weather is favourable, it can be seen at the distance of 6 leagues.

On Fort de la Croix at the eastern point of the island is a white light which is varied every 3 minutes by a red flash, preceded and followed by short eclipses. It is visible all round the horizon, except in the direction of the Glenan Islands, when it is hidden by the heights on the western part of the Ile de Groix.

It may be observed that vessels coming from the southward will perceive the light on Belle Island, which revolves every minute, before the light on Pen-men Point can be seen; and that in approaching the Ile de Groix, the flashing light on the eastern point of the island, will be seen at the same time as the light on Pen-men Point. In like manner vessels coming from the westward, will be exposed to no risk of mistaking the lights, for before the light on Pen-men Point will be visible, they will almost always have seen the great Penmark Light, already described, and also the light on Penfret Island, which flashes every 4 minutes.

PORT LOUIS has a most excellent harbour, but the entrance is rendered difficult of access by numerous rocks. The town stands on the eastern side, and is fortified. To run into the harbour the mark is, the edge of the citadel in a line with St. Catherine's little Convent, standing upon a point projecting into the sea, east of St. Michael's Island; and when you are within the citadel, anchor in 5 or 6 fathoms; or, if it should be high tide, run aground under the town to the northward, for at low water you cannot come under the town, it being dry every tide.

L'ORIENT is about 2 miles above Port Louis, at the bottom of the bay formed by the rivers Pont-scorf and Blavet.

The following directions are from those of M. D'Apres de Manneville:—

“Whether you weigh from the Ile de Groix, or are approaching from the offing, to pass to the westward of the Truies or Sows,* which is marked by a beacon, through the great channel, steer so as to keep Larmor Tower E.N.E., till the southern mill of Kerbel, standing to the eastward of Port Louis, is in one with the extremity of the fortifications of the town. With the latter mark on you will sail in mid-channel between the Saisies of Larmor and the Sows, and as soon as you are so far advanced as to perceive the high land of Penne-mane in one with the western corner of the citadel of Port Louis, steer in that direction, till the westernmost point of St. Michael's Island is brought on with a white mark lying to the westward of the storehouses of L'Orient Harbour; this will lead safe between the Jument Rock, on which is a beacon, and the foot of the citadel. From this situation ships, as most convenient, may pass either to the westward of St. Michael's, or between St. Michael's and St. Catherine's.

“When past the Jument you may sail either to the eastward or westward of St. Michael's Island. If taking the western passage you will proceed until Keroman's House is in one with the miller's white house by the mill near

* The Saisies of Larmor cover at three-quarters flood. The Truies are entirely covered at spring-ebbs, and covered at half-ebb. The Erranis are never completely under water, but dry at low water about 10 feet above the surface. Inside the harbour, the Paix, Potée de Beurre, and Jument all appear above the surface at low tide.

the shore, leaving on the starboard a rock of 12 feet, and on the port or larboard side another named the Hog, covered at half-tide, and marked by a beacon. You will thus pass between the Turk and the Kerneval Bank; the former has a buoy at its southern extremity, and has only 2 feet water on it. Sail on in the above direction, until you have the white mark of the storehouse in one with a single house on the beach, till athwart of St. Michael's, when you may proceed for the road of Pennemane, leaving the half-tide rock named Pengarne, on which is a beacon, on the starboard side.

"The mark for the eastern passage is, the corner wall of St. Catherine's garden in one with a white house standing in the middle of Nezenel Town. This takes you athwart of the south end of St Catherine's, and should be kept on until the little wood of Kerbel, near Port Louis, is seen through the causeway or stone bridge which joins St. Catherine to the main. You will thus pass the Pengarne, which is to be left on the starboard, and when you are a ship's length within it, proceed for the road. It is, however, to be observed, that vessels drawing more than 21 feet cannot make Pennemane Road unless at high water, spring tides; in that case you must anchor at Port Louis.

"In passing the Errants, by mid-channel, it will be necessary to bring L'Orient Tower in one with the western bastion of Port Louis Citadel, at as great a distance as possible,* by which you will leave the Errants on the port or larboard, and the Bastresses Rocks, which are generally marked with a buoy, on the starboard side. You will also pass the Three Stones; and when you have proceeded so far as to bring the fountain on the beach of Gavre in one with the single tree N.E. of the village, keep Larmor Windmill on with two houses nearest the Point of Larmor. You will then enter the great channel, at the point from whence the high land of Pennemane may be seen in one with the western corner of Port Louis Citadel, and may proceed as already directed."

The eastern or Gavre Channel, the passage under Point de Gavre, is used by small vessels only, and being intricate, should not be attempted unless well acquainted. The mark is Larmor windmill in one with the two houses nearest the extremity of the point, which will carry you into the great channel, when you may proceed as before directed.

It is high water, on the days of full and change, between Port Louis and L'Orient at 4½h. The rise of tide, at springs, is about 15 feet.

From Port Louis the coast bends to the southward towards the peninsula of Quiberon. The distance from the port to Beg-en-aud Point, the northern extremity of the peninsula, is 13 miles, and the land between is, in general, low, with downs, &c; but there are several rocks off it at a considerable distance from the shore.

The first of these dangers with which we meet, after leaving Port Louis, is the ledge named the Daniel Rocks, which lie about a mile from Point de Gavre, and dry at low water. About the same distance to the southward of Point de Gavre, there are some spots of 3½ fathoms, named the Basses de Gavre, which have deep water close-to of 6 fathoms. At 3½ miles from the same headland, and close to the shore, are some rocks named La Vache; and a mile farther on, in the same direction, is a rocky ledge which extends a considerable distance from the shore, and appears above the surface of the water when the tide is out. It is named the Rocks of Magoëro, and behind it on the shore is a beacon.

* It should be observed that this mark must not be used until you are past the Point des Chats, the south-eastern extremity of the Ile de Groix, as it is the mark for the Basse des Chats or Venerable Rock, mentioned in Page 16, and upon which are only 12 feet water.

At the distance of 2 miles from the Rocks of Magoëro is the small River d'Etel, the entrance to which is impeded by a bar, and about a mile from the mouth of the river, in a north-westerly direction, are two rocks named Roheu, which are 18 feet above the surface at low water. From the entrance of the river southward to Point d'Ardevenne, the distance is rather more than a mile. This point is rocky all round to some considerable extent, and many small heads of rocks appear at low tide, the principal of which is named Rohellan, and is always dry. At 2 miles to the south-westward of the point is an extensive rocky bank of 5 to 7 fathoms, with numerous patches of a much less depth upon it, there being in many places not more than 10 feet water. Upon the western part of this bank are some rocks named the Black Stones, or Chiviguete Rocks, which dry at low water; they lie with Ardevenne Church in one with the centre of Rohellan Rock, and Men-toul Rock in one with the southern part of Fort Penthièvre. All round this bank are 8 to 10 fathoms, grey sand and rocky soundings.

From Point d'Ardevenne to Beg-en-aud Point the distance is nearly 6 miles, the shore being low all the way, until you get near the last-mentioned point, when it rises a little and becomes bolder. A short distance from this point is Fort Penthièvre, which has already been given as a mark for the Chiviguete Rocks. Here, at a mile from the shore, are the Tevieg Islet and other rocks, which extend still farther to the northward, and are exceedingly dangerous to vessels rounding the Peninsula of Quiberon. These rocks join Beg-en-aud Point, and run to the northward of it nearly 3 miles, so that no stranger should approach this part of the coast too near.

About $5\frac{1}{4}$ miles to the westward of Beg-en-aud Point is the Birvideaux Shoal, an extensive bank of 4 to 7 fathoms, rocky soundings. Near the centre there is much less water, there being in one place a depth of only 8 feet, which lies with Portivi windmill in one with Point du Portz-guen, bearing E. $\frac{1}{4}$ S., and Borderun Semaphore, on Belle Isle, in one with the guard-house of the battery on Point du Vieux Chateaux, bearing S. by W. Between this bank and Belle Isle is deep water of 20 to 25 fathoms, increasing gradually as you approach the island, the bottom being rocky near the bank.

From Beg-en-aud Point the land to the southward, forming the Peninsula of Quiberon, is high, and appears with a bold cliffy shore. Off its southern extremity it is foul to a considerable distance, there being many rocks both above and under water. Of these the outermost, named the Teignouse, is distinguished by a lighthouse, showing a light which flashes every 3 minutes. The lantern is 59 feet above high water, and each flash of the light is preceded and followed by short eclipses. It can be seen in clear weather about 10 miles off.

The Teignouse Rock is a large high round rock, and is distant from the extremity of Quiberon Peninsula about $1\frac{1}{4}$ mile, and there exists no passage by which vessels may sail within the lighthouse, as between the rock and the shore is all foul ground. But outside the lighthouse, between it and the Beniguet Islands, is a channel named the Teignouse Channel, which is frequently used.

BELLE ISLE is extensive, being nearly 10 miles long and 3 to 4 miles broad, and being high and steep, may be seen at a considerable distance: it also affords good shelter during westerly and south-westerly gales. The island is well cultivated, producing corn in abundance; it is also strongly fortified, batteries commanding its most accessible parts.

The north-western extremity of the island lies in lat. $47^{\circ} 23' 18''$ N. and long. $3^{\circ} 14'$ W., and is rocky to a considerable distance off; a reef, named the Poulains, surrounding the point to the extent of about a mile. Many of

these rocks appear above the water at low tide, and there are numerous shoal spots near them, so that it is prudent to avoid approaching this part of the island nearer than 2 miles, particularly as the rocks are steep-to, there being within a short distance of them a depth of 11 to 15 fathoms, rocky bottom with a little sand. On the southern side of the island are a great number of rocks both above and under water, all of them lying within a mile of the shore.

Palais, the capital of the island, is on the north-eastern side. The haven is formed by a pier of stone, which is 200 feet long. There is also a citadel, which is built on a rock, and its walls bound the haven, which is entirely dry at low water, and has only 5 feet water in it when the tide is up. The road is considered a safe one, but there is a shoal in it of $4\frac{1}{2}$ fathoms, named the Basse du Palais, lying about half a league from shore, and to the eastward of the citadel.

On the north side of the island, at rather more than 3 miles from Palais, is Port Sauzon, the harbour of which is considered preferable to that of Palais, although the latter is most frequented. It is said to be capable of receiving vessels of 50 tons, but which, however, must lie dry at low water. There are several other roads for small vessels. Those principally used are on the northern side of the island, under the Citadel of Palais, and about a league to the eastward of Palais, and others on the eastern side of the island, south of Point Kerdonis. Larger vessels may ride in good anchorage all the way from Sauzon to the road of Le Grand Sable, which is a short distance from the eastern point of the island, only taking precaution to keep a good mile from the shore, in from 7 to 15 fathoms, according to the distance.

If coming from sea, and making the island with the wind at N.W. or W.N.W., you may run along the south side of the island at the distance of 2 miles to Point de l'Echelle (Beg-er-squèle), the south-eastern extremity. From this point haul up towards Point Kerdonis, the eastern point of the island, which is situated about half a league from the former, as under shelter of this point you may find anchorage in from 15 to 8 fathoms, and ride secure from N.W. and westerly winds. Should the wind veer towards the S.W., you may run to the northward of this point, and anchor on the N.E. side of the island, upon a bottom of sand, mud, and shells.

The lighthouse on the S.W. point of the island exhibits a powerful revolving light, which is eclipsed every minute. Its height above the level of high water is 276 feet, by which it is rendered visible at the distance of 27 miles. That this light may not be mistaken for the light on the Plateau du Four to the eastward, observe that the flashes of that light succeed each other at intervals of 30 seconds, and that this light presents between the flashes a fixed light, visible, in clear weather, at a distance of more than 3 leagues.

Also, that the elevation of this light exceeds, by 197 feet, that of the Plateau; and farther, that on approaching this light, the high land of the island can be distinguished even at night.

Again, it is scarcely possible that a vessel standing in from sea can make the light on the Plateau du Four, without having seen either that of the Ile d'Yeu, or of the Pilier, or the one on Belle Isle.

The harbour light at Palais, on the north-eastern part of the island, is situated on the head of the great mole, at the south side of the entrance to the port. It is a small stationary light, being only 30 feet above the sea, and can be seen 9 miles.

In the channel between Belle Isle and the islands on the south side of Quiberon Bay, are from 8 to 12 fathoms water, excepting about mid-channel, when there are some shoals of $3\frac{1}{2}$ to 8 fathoms, named the Banks de Tallifer. *These lie with Palais Citadel bearing S.W. by W. and Teignouse Lighthouse*

N.E. by E. $\frac{1}{4}$ E. From these shoals, southward to Palais, are a series of shallow ridges, but none of them are dangerous, there not being upon any of them less water than 10 fathoms.

QUIBERON BAY is formed by the Peninsula of Quiberon, followed by an extensive range of islands and rocks; the former, in succession, being named the Beniguet Islands, Houat and its group, and Haedik; the whole being terminated by the high rocks named the Cardinals. We shall follow them in this order in our description.

THE BENIGUET ISLANDS are a cluster of small islands and rocks lying upon a bank of shallow water at the distance of about $1\frac{1}{4}$ mile from the Teignouse Lighthouse. At the northern end of the bank are some rocks which dry, named the Esclassiers, and close to them are some patches of $1\frac{1}{4}$ to 3 fathoms. The marks for these rocks are Fort Penthièvre $2^{\circ} 6'$ open to the right of Fort Riberen, and Les Sœurs, Men Fourchec, and La Vielle Rocks, all in one, bearing S.E. In the passage between these rocks and the Teignouse Lighthouse are from 10 to 20 fathoms, very irregular soundings upon a bottom of rock and shells. The tide sets directly through it, that is E.N.E. and W.S.W., spring tides running at the rate of 2 or $2\frac{1}{4}$ knots.

Nearly in the centre of the western entrance of this channel is a shoal named Goué-vas, upon which there are in many places not more than 6 feet water. It is about half a mile in extent, and has from 6 to 12 fathoms close to all round. Its marks are Les Sœurs, Men Fourchec, and La Vielle Rocks all in one, and Petit Mont open $2^{\circ} 20'$ to the right of Teignouse, bearing E. by N. $\frac{1}{4}$ N. Within this bank, towards the Beniguet Islands, are a number of small patches of 4 to 5 fathoms, named the Basses du Milieu. Between and around them are 10 to 12 fathoms.

At the eastern entrance of the passage, at about 2 cables' distance S.S.E. from the Teignouse Rock, is a small shoal of 6 feet named Basse Nouvelle. It lies with Loc-maria Church in one with the rock, and has 11 fathoms at a short distance to the southward of it.

If you are off the N.W. end of Belle Isle, and desirous of sailing through this channel, steer E. by S. $\frac{1}{4}$ S. until Teignouse Lighthouse bears N.E. by E. $\frac{1}{4}$ E. Or, if from the S.E. end of the island, steer N. $\frac{1}{4}$ E., until the lighthouse comes upon the above bearing. Steer then with the lighthouse in that direction between the Goué-vas Bank and the small patches named the Basses du Milieu, until Fort Penthièvre appears open $2^{\circ} 6'$ to the right of Fort Riberen, when you change your course to E. $\frac{1}{4}$ S. and run into Quiberon Bay.

You may sail into the channel to the north of the Goué-vas Bank, by bringing the lighthouse to bear E. $\frac{1}{4}$ N., but this passage is much narrower than the former.

HOUAT ISLAND lies about $5\frac{1}{4}$ miles to the south-eastward of Quiberon Peninsula, and immediately to the southward of the Beniguet Islands, being separated from them by a narrow channel of 10 fathoms water. This is an irregular island about 2 miles long, lying S.E. and N.W. It is moderately clear on the northern side, but on the south-western side are a number of islands and rocks, named the Chevaux, many of which are covered, and only appear when the tide is down. These rocks and islets run in a direction nearly parallel to the island, being distant from it about $1\frac{1}{4}$ mile, and there is deep water of 8 to 10 fathoms immediately to the southward of them. The north-western extremity of the Chaussée de l'Île de Chevaux, as it is named, is a rock of $2\frac{1}{4}$ fathoms, lying with Chevaux Islet in one with the S.W. point of Haedik Island, and the Rouleau Rock off the northern point of

Houat Island open 56' to the left of the Men-er-broc Rock, off the same end of the island.

To sail from Quiberon Bay through the Beniguet Passage, which is the narrow channel between the islands of the same name and Houat Island, get the S.E. end of Belle Isle open, and you may run boldly on, close to the rocks, and run in and out with great safety. The channel is not more than 2 cables' length wide, and there are 13 to 14 fathoms midway between the rocks that form the passage, and 7 fathoms close to the rocks on either side of it. If bound out through this passage, from Quiberon Bay, bring St. Gildas Monastery to bear E. by N. by compass; then steer West or W. by S. There are three small rocks lying from the N.W. end of Houat about a musket-shot, which you are to leave on your port or larboard side.

The tide sets directly through this passage, that is in an E. by N. and W. by S. direction, with greater strength than it does in the Teignouse Passage.

The S.E. end of Belle Isle bears from this passage S.W. $\frac{1}{4}$ W., and the N.W. end of the same island bears W.N.W. By these bearings you may shape your course for either side of Belle Isle, but if you go to the southward you must be careful to avoid the outermost ledge of the Chaussée de l'Ile de Chevaux, the marks for which have been already given.

From the eastern point of the island a bank of 3 to 3 $\frac{1}{2}$ fathoms extends in an E.S.E. direction about 2 $\frac{1}{2}$ miles. It is named the Bank of Houat, and bounds Haedik Road on the northern side.

HAEDIK ISLAND, with its group of rocks, lies about 3 $\frac{1}{2}$ miles from Houat Island, being separated from it by a narrow and intricate channel, named Les Sœurs, through which the tide sets with considerable strength. The depth here is from 5 to 7 fathoms, but as there are numerous patches of much less water, a stranger should not attempt to run through, unless guided by an experienced pilot.

The island is about a mile in extent, and produces excellent water. Shingle-ballast can also be obtained here, and fine sand in abundance. It is surrounded by rocks and foul ground to a considerable distance, many heads of the ledges appearing above water when the tide is down. To the S.E. of the island, about 1 $\frac{1}{2}$ mile distant, is a group of rocks named the Cardinals, many of which are always above water. The extremity of these rocks bears from the south-eastern end of Belle Isle about E.S.E. $\frac{1}{4}$ E., distant 11 miles.

The lighthouse upon the island stands about 601 yards to the westward of the eastern point, and shows a single fixed light at 85 feet above the sea, visible 9 miles. The building is 39 feet high, and was erected in the year 1836. It is high water here, on the days of full and change, at 3h. 40m.

Should your vessel be driven to the eastward of Belle Isle, you must give the Cardinals a good berth,* and may then haul up to the northward for anchorage. In Haedik Road there is good riding in from 8 to 12 fathoms, upon a bottom of clear soft clay and mud, with the Cardinals bearing from South to S.S.W. With these bearings you will be shut within a bank of 7 to 10 fathoms, named De l'Artimon, and which consists of foul ground, having an extent of about three miles. This bank bears from the Cardinals E. by N. to N.E. and is very destructive to the cables of vessels.

* It is requisite to give the Cardinals a wide berth on account of some shoal spots lying about three-quarters of a mile from them. A shallow patch of 3 fathoms, named the Basse des Cardinaux, lies S.S.W. of the rocks, distant nearly a mile. There are 11 fathoms all round it, so that *great care is necessary* to avoid it. In 1842 a vessel named the Pearl, from Nantes, was reported to *have struck upon a sunken rock*, bearing from Haedik S.W. $\frac{1}{4}$ W., distant 3 miles. But this danger *is scarcely likely to exist*, the French surveyors having found 18 to 20 fathoms hereabout.

QUIBERON BAY is extensive, being from 3 to 4 leagues in extent; that is, from the Islands of Haedik and Houat to Point St. Gildas, and you may sail within gun-shot of either. In the northern part of the bay are the towns of Vannes, Noyallo, and Auray, and vessels approaching them should pass to the eastward of the Cardinals.

To the northward of Houat Island there is good anchorage, also from hence to Morbihan. Excellent anchorage is also found in the north part of the bay, under Quiberon Peninsula, by bringing the Teignouse Rock to bear from W. by S. to S. W. by S. The place to lie in is about midway between the rock and the coast of Vannes, towards Mount St. Michael, in from 10 to 11 fathoms, mud and sand. There is very little tide in the bay.

The course, from the east end of the Cardinals, for the Rivers Auray, or Vannes, is N. $\frac{1}{2}$ E., $4\frac{1}{2}$ leagues, the entrance to both being the same; on the west of which is a rocky bank, with the small Islands of Meaban, that extend 3 miles from the land, in a southerly direction. Having arrived within the island, which are left on the port or larboard, proceed towards the eastern shore, in 7 and 8 fathoms, and when within the east point, you will perceive the two rivers. These have always a rapid current, and should not be attempted without a pilot.

Upon Point Novallo, on the south side of the entrance, is a fixed light at 72 feet above the sea, visible 9 miles. It is high water here on the days of full and change at 3h. 45m.

From Point Novallo the coast bends to the southward, a distance of 4 miles, to Point du Grand-mont, near which is the Monastery of St. Gildas. From this point a bank of $3\frac{1}{2}$ and 4 fathoms extends nearly 3 miles in a W. by N. direction. It is named the Plateau du Grand-mont, and has numerous shoal spots upon it, the outermost of which is named the Basse de Thumiac, and has but $3\frac{1}{2}$ fathoms upon it. This lies right before the entrance of Morbihan, at the distance of about 2 miles from the bar, with Point Novallo in one with Badene Church, and St. Gildas Monastery in one with Trest Mills, bearing E. by S. Between this patch and the Bar of Morbihan there are two other small spots of 2 and 3 fathoms.

Within the Basse de Thumiac towards Point St. Gildas, there is another shoal of but 2 and 3 feet water lying with the monastery bearing E.S.E., distant $1\frac{1}{2}$ mile. It is named the Basse de St. Gildas, and has 12 to 13 feet between it and the shore. There is another small bank, named the Basse du Grand-mont, having 5 feet upon it and a rock which dries when the tide is down, lying three-quarters of a mile from Point du Grand-mont, with St. Gildas Monastery bearing N.E. by E., distant one mile, and Lomariaker Church and Point Novallo in one, bearing N. by W. $\frac{1}{2}$ W.

At rather more than a mile to the south-eastward of Point du Grand-mont is Point Bauzec, off which is a rock which dries and is connected to the shore by a rocky ledge. About a mile farther on is Point St. Jacques, which is foul some distance off, and has a shoal of $1\frac{1}{2}$ fathom at a mile to the S.S.E. of it, named the Basse de St. Jacques. Between this shoal and the land are 13 to 20 feet, and outside it, a little off, about $3\frac{1}{2}$ fathoms.

About 3 miles to the southward of Point St. Jacques, is an extensive shoal, running for an extent of nearly 5 miles in a direction parallel to the coast. It is named the Plateau de la Recherche, and is in breadth about half a mile, the general soundings on it being $3\frac{1}{2}$ to 7 fathoms, although there are places where there is a much less depth of water. The west end of the shoal, in 4 fathoms, lies about $4\frac{1}{2}$ miles, S. by W. $\frac{3}{4}$ W., from St. Gildas Church, and $5\frac{1}{2}$ miles, N.E. $\frac{1}{2}$ N., from the lighthouse on Haedik Island, with Lomariaker Church open $2^{\circ} 30'$ to the left of Port Novallo Point. From thence the

soundings on the bank are 4 to 7 fathoms to a small knoll of 7 feet, named Lomariaker Rock, which lies in nearly the centre of the bank, with Lomariaker Church in one with Point Novallo, and the north part of Dumet Island in one with the south part of Beaulieu Wood, bearing S.E. by E. $\frac{1}{4}$ E. The distance from this knoll to another of almost similar depth, is about $1\frac{1}{4}$ mile. This last patch is named Sarzeau Rock, and has several small shoal spots of $2\frac{1}{2}$ to 3 fathoms around it; its marks are Point Petit-mont open 85' to the left of the Point du Grand-mont, and the north point of Dumet Island bearing S.E. $\frac{1}{4}$ E., distant 6 miles. The eastern end of the bank lies with Dumet Island bearing S.E. $\frac{1}{4}$ S., and Point Penvins N.E. by E. All round this bank are 8 to 9 fathoms, bottom of mud and clay; and vessels approaching the Vilaine River will do well not to approach it too closely, but to keep in mid-channel with Dumet Island, which will be about $2\frac{1}{4}$ miles from the island.

If sailing to Morbihan, and steering up from the Cardinals' Rocks, you will go clear of the west end of the bank by bringing St. Gildas Church to bear N.E. by N.

RIVER VILAINE.—From Point St. Jacques the coast runs E.S.E., about 10 miles, to Point Kervoyal, at the northern side of the entrance to the river. Nearly half-way between is Point Penvins, off which the ground is foul some distance, and to the eastward of this point is a small place, named Port Penderf, situated at the entrance of a little river, which will be useful for shipping when beacons are erected to point out its channels. Between Point Penvins and Point Kervoyal is a large extent of foul ground, named the Plateau des Mats, which extends about $1\frac{1}{4}$ mile from the shore, and consists of ledges of rocks which cover and uncover with every tide.* In making the river, it will be prudent to keep full $1\frac{1}{4}$ mile from the shore in order to avoid these rocks.

The best course to the river is to the north of Dumet Island. From a point, $1\frac{1}{4}$ mile, S.E. of the Cardinals, steer 8 miles, N.E. by E., until Dumet Island bears S.E., 3 miles distant. Steer then E. $\frac{1}{4}$ N. for the entrance of the river, which will be about 8 miles distant. When steering thus, you must be careful to avoid running upon the shoal ground surrounding Dumet, and precaution must be observed to give a berth to the Plateau des Mats off the north side of the entrance to the river. The soundings will shoalen gradually in this course, for from 12 fathoms off the Cardinals, you will come into 8 near the island, and will find $1\frac{1}{4}$ at the entrance of the river.

Dumet Island is small and irregularly shaped, its extent being not more than half a mile. A bank of $3\frac{1}{2}$ to 4 fathoms surrounds it on every side, running in a north-easterly direction from the island about $1\frac{1}{4}$ mile. There are several shoal spots on it of 8 feet and more, so that it is advisable when sailing on the east side of the island, not to approach it too closely, more particularly as a sunken rock lies about half a mile from the island, and appears at low water, at which time it is 4 feet above the surface.

When running for the river, you can go on either side of Dumet you please, but the northern side is considered the best, the channel being wider and more clear. If you sail on the southern side of the island, it will be requisite to keep the lead going, and to be exceedingly cautious not to approach the island too near, on account of the above-mentioned rock and shallow flat which lie off it. Between the island and Point Castelli, there is an extensive bank, named the Plateau de Piriac, which extends from the point towards the

* A mark that has been given for the most eastern part of this Plateau, is the wall used as a beacon behind Point Kervoyal, in one with the point, and in passing the rocky ledge, an approach must not be made within this line of direction.

island about $1\frac{1}{4}$ mile. The soundings on it are 6 to 4 fathoms, decreasing towards the land; but there are many much shoaler spots, which make the bank dangerous.

On Point Penlan, the northern side of the entrance to the river, is a small fixed light, which is shown from the turret of a building lately erected on the point. It is 52 feet above the sea, and is visible in clear weather about 9 miles off. In steering into the river, a berth must be given to the rocks which extend about half a mile from Point Haliguen, the south side of the entrance. When within these you may anchor. It is advisable to take a pilot for this river, as the navigation is somewhat intricate. It is high water, on the days of full and change, at 3h. 45m. The vertical rise of tide is 9 feet.

CROISIC.—From the River Vilaine to Croisic the distance is about 12 miles, the land between being generally low and flat. A short distance inland from Croisic is seen the high pointed steeple of Guerande, together with another of stone, situated within the Point of Croisic, named the Tower of Bâts, which marks will materially assist in making this part of the coast.

In steering for this port from the River Vilaine, it is requisite to be very cautious when passing the Point de Castelli, on account of the rocky bank already mentioned, which extends from it towards Dumet Island. After rounding this point there is no danger, and you may steer direct for the harbour. If from the Cardinals, your course is between Dumet Island and the Plateau du Four, which is distinguished by a lighthouse. To go clear of all danger, you must not bring the Tower of Bâts to the southward of Point Croisic.

This place is of difficult access, its entrance being impeded by rocks and strong currents; for no sooner is it high water than the ebb forces you back, and one as well as the other carries the ship directly towards the dangers. It is, therefore, visited by small vessels only. The harbour dries with every tide.

Two small fixed lights now facilitate an entrance to the port. The first is near the shore, at 492 yards to the northward of the church, and the second at 50 yards from the former. They bear N.N.W. and S.S.E. of each other. The lights in one lead into the harbour, but it should be noticed that this direction ranges very near 2 rocks, situated half a mile, S. $\frac{1}{4}$ E., from a beacon on a rock named Le Trehic, which uncovers to the height of 3 to 5 feet at low water. It would, therefore, be imprudent to attempt the passage by night without the assistance of a pilot.

The extensive bank named Le Four lies about $8\frac{1}{4}$ miles to the W.N.W. of Point Croisic. It is about $3\frac{1}{4}$ miles long and from 1 to $1\frac{1}{4}$ broad, and has on it from $\frac{1}{4}$ to 3 fathoms, excepting in its northern part, where for a considerable extent it dries at low water. At the southern end of the bank is a patch of 5 feet, named Goué-vas, which lies with the Semaphore de la Romaine open 48' to the right of Guerande Church. Within this and the dry part of the bank, is a small rock that appears at low tide, at which time it is about $3\frac{1}{4}$ feet above the surface.

There are other spots on the bank equally as dangerous, so that a good offing must always be given to it when approaching the River Loire.

The lighthouse on the Four Bank stands at the northern end of the shoal, upon the extremity of the rocky ledge which dries. It shows a revolving light, the flashes of which succeed each other at intervals of 30 seconds, but the light will not entirely disappear within the distance of 7 or 8 miles. The lantern is elevated 79 feet above high water, and shows the light to the distance of 18 miles *in clear weather*.

About midway between the lighthouse and Point Croisic is a shoal of 3 to 5 fathoms, named Basse Hikeric; the depth around it is from 8 to 9 fathoms, but there are several patches hereabout of like soundings. The Point of Croisic is rocky some distance out towards the N.E., their being at three-quarters of a mile in that direction some small spots of 2 feet named the Basse Castouillet.

A small shoal of 6 fathoms, but in one spot of only $3\frac{1}{2}$ fathoms, lies $3\frac{1}{2}$ miles from the lighthouse in a W. by S. $\frac{1}{4}$ S. direction. It is named the Basse Capella, and forms the northern end of a bank of 6 to 8 fathoms, named the Bank de Guerande, which runs to the southward about $5\frac{1}{2}$ miles.

RIVER LOIRE.—The north channel to the entrance of the river is bounded on the south side by the following dangers:—

A small shoal of $4\frac{1}{2}$ fathoms, named the Basse Michaud, lies with Le Four Lighthouse bearing North, distant $5\frac{1}{2}$ miles; the extremity of Point Croisic N.E. $\frac{1}{4}$ N., $4\frac{1}{2}$ miles; and the tower on the Turk Rock S.E. $\frac{1}{4}$ S., $5\frac{1}{2}$ miles. It is about 3 miles from the north end of La Banche Shoal, the mark to sail between them being the Tower de Bâts in one with the great Church at Guerande, and has $9\frac{1}{2}$ to 12 fathoms all round it.

The Basse de l'Astrolabe is a small shoal of $4\frac{1}{2}$ to 6 fathoms, lying about $2\frac{1}{2}$ miles to the westward of La Banche, with the tower on the Turk Rock bearing E. by S. $\frac{1}{4}$ S. It is surrounded on all sides by $7\frac{1}{2}$ to 12 fathoms. The mark to clear it on the west side is Escoublac Church open $1^{\circ} 15'$ to the left of Point Pain-chateau.

The extensive Bank of La Banche is exceedingly dangerous, there being many parts of it dry at low water. The north-west extremity of the bank, a patch of $1\frac{1}{2}$ fathom, lies with Escoublac Church open $1^{\circ} 15'$ to the left of Point Pain-chateau, and the tower on the Turk Rock bearing S. by E. $\frac{1}{4}$ E. From thence it extends in a S.S.E. direction about $3\frac{1}{2}$ miles, being nearly a mile in breadth, to a spot of 7 feet named the South-east Rock, which lies with La Pierre Percée in one with Poulhaut Mill, and the Turk Tower bearing N.W. $\frac{1}{4}$ W. The northernmost of the rocks which dry are named the Three Stones, and when the tide is down they appear about 9 feet above the surface. From thence to the ledge named the Turk is about $1\frac{1}{2}$ mile, it being all foul ground between. The Turk shows itself at low water, and is distinguished by a round tower of stone 30 or 40 feet high. All round this bank are from 5 to 12 fathoms, but to the south-westward of the tower, at the distance of $1\frac{1}{2}$ mile, are 2 small spots of $5\frac{1}{2}$ fathoms, named the Basses de Turk.

La Lambarde, a shoal of $1\frac{1}{2}$ to 6 fathoms, is before the entrance to the river. It is nearly 2 miles long by one broad, and has from 6 to 10 fathoms close to all round, being steeper on the southern than on the northern side. One part of it is very dangerous, as it uncovers at low water, being then nearly awash; the marks for it are St. Nazaire Steeple open $2^{\circ} 30'$ to the right of the Tower of Aiguillon, Point St. Gildas bearing S.E. $\frac{1}{4}$ S., distant $5\frac{1}{2}$ miles, and the tower on the Turk Rock W.N.W. $\frac{1}{4}$ N., $3\frac{1}{2}$ miles.

The north side of the north channel to the river is bounded by the coast and the several dangers which lie off it. The following describes them:—

From Point Croisic the land bends to the south-eastward, about 6 miles, to Point Pain-chateau, the coast between being moderately clear of dangers, excepting those close in-shore. But, half-way, off the Tower des Bâts, there is a rocky patch named the Basse Lovre, upon which there is not more than a half to 3 fathoms. This extends nearly a mile from the land, so that it is *prudent* when coasting along, not to approach the shore nearer than $1\frac{1}{2}$ mile *so that you may be certain to avoid it.* Just round to the northward of Point

Pain-chateau is a small place named Port Pouliguen, and the coast here takes a sweep and forms an extensive shallow bay, at the back of which are some sand-hills and the church and mill of Escoublac.

In a line nearly S.E. by S. of Point Pain-chateau, is a series of rocks and shoals, of which some are above and some under water. At less than half a mile to the south-westward of them are 5 and 6 fathoms.

The first of this series is the Leven, which is a rock almost covered at half-tide, and upon which are three hillocks, about 24 feet in height. Near this are several other ledges which are covered at high tide, and are separated from Point Pain-chateau only by a narrow channel of 3 fathoms water.

About a mile from the Leven Rock are several ridges which dry at low water, at that time appearing from 5 to 6 feet above the surface. These are named the Troves.

La Pierre Percée is a small islet elevated about 30 feet above the surface at low water. Within it, about half a mile to the northward, is a rock named the Baguenaud, which is nearly covered at half-tide, and has a bank of sand upon it always visible. To the eastward of these, but close to the shore, are some rocks named La Vieille and Les Fromantieres, which are dry when the tide is down.

About a quarter of a mile to the S.E. of the Pierre Percée is the Longue Folle Rock, a sunken reef, upon which there are only 7 feet at low water spring tides; and about half a mile farther, in the same direction, is another rock named the Grand Charpentier, which is even with the sea at high water of neap tides. To the east of these, towards the shore, are several other banks and rocks, all which are more or less dangerous.

To facilitate the entrance to the river, two towers stand on the north shore, which brought into one formerly led over the bar, but owing to changes in its position, this line of direction can be no longer safely followed, as it will lead over the eastern part of the Bank des Charpentiers. It is, therefore, requisite to keep the flashing light of the Tour du Commerce a little open to the right or eastward of the fixed light of the Tower d'Aiguillon.*

On the eastern side of the bar is a rock named Le Vert, which appears 7½ feet above the surface when the tide is down. Its position is denoted by a beacon.

A little to the southward of this rock, is another reef, named Les Jardinets, which also dries. Within the river, on the east side of the channel, and nearly opposite the Tour du Commerce, is another rock named the Morées, which has a beacon upon it. This uncovers with every tide, and in using the channel you must be careful to avoid getting on it.

The course followed by vessels bound for the Loire has usually been to the northward of Le Four Bank, and thence south-eastward toward Croisic Point; but with southerly winds, the channel to the river may be gained with more facility by entering between Le Four and La Banche, or by going to the eastward of the latter.

The south-eastern part of Le Four will be avoided by keeping the Church of Croisic well open to the westward of the steeple of Guerande; and the northwest end of La Banche will be cleared by keeping the steeple of Guerande a sail's breadth to the N.W. of the Tower of Bâts. Either of these marks may be kept on until the lighthouse on the Four Bank bears, by com-

* The Tour d'Aiguillon is the tower first met with in entering the river. It exhibits a fixed light at 112 feet above the sea, visible in clear weather about 12 miles off. From this lighthouse to the Tour du Commerce, the bearing is N. 56 deg. E., distant 214 yards. The light from this latter building is at an elevation of 128 feet above high water, and flashes at intervals of 2 minutes. It can be seen about 14 miles off in clear weather.

pass, N.W. $\frac{1}{4}$ N.; and this line of bearing, or a course S E. $\frac{1}{4}$ S., will lead directly to the bar of the Loire, when you may run into the river by bringing the Tour du Commerce a little open to the right or eastward of the Tour d'Aiguillon.

As already mentioned, the shore to the south-eastward of Croisic is rocky, and there is a reef named the Basse Louvre, at the distance of full half a mile from shore, and nearly 3 miles, S.E. $\frac{3}{4}$ S., from Croisic Point. The passage is, therefore, between this reef and the Three Stones, on the N.W. end of La Banche, or the Turk Bank. The course to abreast the Pierre Percée, or Pierced Rock, is, therefore, S.E. and S.E. by S. Steer so as to leave this rock at the distance of half a mile on the port or larboard side, and then continue a S.E. course (allowing for the tide, which runs strongly) until you bring the high light of the Aiguillon Towers a little open to the right of the lower one. Steer in the latter direction, with the lighthouses nearly in one, until you come near to l'Eve Point: next proceed on an East course, to pass the Point La Ville Martin, taking care not to bring a pyramid, which stands to the south-westward of the lower lighthouse, in a line with it; as thus you will avoid the rocks which extend from the Point of La Ville Martin, and will sail clear of the Morées, which lie half a mile south from that point. Hence you may proceed to anchor in Mendin Road, E.S.E. of St. Nazaire, in from 6 to $3\frac{1}{4}$ fathoms. If proceeding hence to Nantes, the ship must be conducted by a pilot, and farther instructions are therefore unnecessary.

At a league to the north-eastward of the Tower of Aiguillon, is the fixed harbour-light on the New Mole of St. Nazaire, which may be seen about 8 miles off.

On sailing out of the River, you proceed westward, and pass within half a mile of the Fort of La Ville Martin, taking care, as above directed, not to bring the pyramid on with the lower or westernmost lighthouse. You may pass De l'Eve Point within a quarter of a mile; and, when you have brought the lighthouses nearly in one, run out in that direction between the Turk and La Couronnée. In following this course, after having cleared the Lambarde on the one side and the Couronnée on the other, you will deepen your water to 9, 10, and 12 fathoms, but you should beware of approaching too closely to the Island Pilier. Give it a berth of $1\frac{1}{4}$ mile at least, or 2 miles, and do not shoalen your water to less than 6 fathoms.

In a large vessel, as soon as Pilier Island bears S. by E., appearing then in one with Point de Devin, alter your course to W.S.W., so as to keep in the Grand Channel.

Point St. Gildas, on the southern side of the entrance to the River Loire, is foul for some distance out to the northward. About $2\frac{1}{4}$ miles west of the point is a rock named La Couronnée, which appears at low water only, at that time appearing 7 feet above the surface. It lies with La Pierre Percée in one with the western extremity of the high downs of Escoublac, and has some shallow patches of a $\frac{1}{4}$ to 2 fathoms water, at less than a mile to the northward of it. Within this rock, towards the land, are 6 to 7 fathoms, and outside it 6 to 10 fathoms. To keep clear of all danger in striking this rock when leaving the Loire, run out of the river with the Towers of Aiguillon in one, and it will carry you about $2\frac{1}{4}$ miles to the westward of it.

A little to the south-eastward of the Couronnée, is the commencement of a shoal named the Kerouars, which runs in a direction parallel to the coast, for a distance of about 4 miles. Upon it the average depth is $1\frac{1}{4}$ to 3 fathoms, but in parts it is so shallow as almost to dry at low water. The soundings *within it, towards the coast*, are $4\frac{1}{4}$ to 6 fathoms, and outside it $6\frac{1}{4}$ to $8\frac{1}{4}$ fathoms.

BOURGNEUF BAY.—From Point St. Gildas the coast bends to the S.E. $\frac{1}{2}$ E., about $5\frac{1}{2}$ miles, to the small port of Pornic, the land between being moderately high and clear of rocks, excepting those which lie close in-shore. About $1\frac{1}{2}$ mile from the coast, is the above-mentioned bank of Kerouars, and opposite Pornic is another shoal, of a similar character, but which has some rocky ledges upon it, which become dry when the tide is down. It is named the Basse Notre Dame, and between it and the shore, to the eastward, is no passage, as extensive dry flats and rocks join the land in that quarter.

Pornic Harbour dries, and can, therefore, only be used by small vessels. A fixed light, visible about 10 miles, has been established on Point Novillard, the western side of the entrance, which is useful to those navigating in the vicinity.

From Pornic to Bourgneuf the distance is about $7\frac{1}{2}$ miles, in a southerly direction; but masters of vessels desirous of coming here, will always require a pilot, if they are at all unacquainted with the navigation, as the eastern part of the bay is full of dangers.

The southern part of Bourgneuf Bay is bounded by the northern part of Noirmoutier Island. Point de l'Herbaudière, the north-west extremity of the island, lies S.W., nearly 7 miles, from Point St. Gildas, the space between forming the entrance to Bourgneuf Bay. Upon Point de l'Herbaudière is a battery, and foul ground extends off it to some little distance. At $2\frac{1}{2}$ miles, N. $\frac{1}{2}$ W., from this point is the small Island of Pilier, upon the north-western point of which is a lighthouse, which shows a light varied by a brilliant flash, every 4 minutes. It is 105 feet above the sea, and can be seen about 18 miles off in clear weather. A little to the northward of this island is a ledge of rocks, named Les Cheveaux, some of which are dry at low water.

Pilier Island should not be approached nearer than 2 miles in any direction, and no passage should be attempted between the island and the shore, as dangers are thickly besprinkled about in all directions. The north-eastern part of Noirmoutier Island is also surrounded with ledges of rocks, and other dangers, which extend out about $2\frac{1}{2}$ miles.

In sailing from Belle Isle to Bourgneuf Bay, steer S.E. for the Isles of Pilier and Noirmoutier; and when Pilier bears southerly, about 3 or 4 miles, steer S.E. by E., till the convent and Noirmoutier Castle are in one, which will carry you clear of the Banc de la Blanche. Steer then S.E. till you reach the Monk's Stone, which may be passed on either side; run southerly into the Rade du Bois de la Chaise, and anchor in $3\frac{1}{2}$ or 4 fathoms, the Church of Noirmoutier bearing W.S.W., distant 2 miles, taking care to avoid a shoal which lies nearly in the middle of the Rade, with only from 1 to 7 feet on it. This shoal extends east and west about half a mile, and its western end, which is the shoalest, lies three-quarters of a mile, E.N.E., from La Cobe Rock, having 3 fathoms in mid-channel between them; or anchor farther out in still deeper water; or take a pilot to carry you into Bourgneuf. There are many dangers in this bay, and therefore a stranger will always find a pilot necessary. The tides flow about 4 o'clock, on the days of full and change, and the variation is 24° west.

THE ISLAND OF NOIRMOUTIER is extensive, but irregularly shaped, being very narrow in the middle, at that part not exceeding a quarter of a mile in breadth. Its length is about 9 miles, and the shores on all sides of it are studded with dangers. Point Devin, the north-western point of the island, has foul ground off it, to the distance of $3\frac{1}{2}$ miles, the principal part of which consists of a rocky ledge, drying at low water, named the Bœufs, and in the same direction from the point is shallow water of 3 to 4 fathoms, which extends $6\frac{1}{2}$ miles from the land. Farther out, about 8 miles, are 10 fathoms

Houat Island open 56' to the left of the Men-er-broc Rock, off the same end of the island.

To sail from Quiberon Bay through the Beniguet Passage, which is the narrow channel between the islands of the same name and Houat Island, get the S.E. end of Belle Isle open, and you may run boldly on, close to the rocks, and run in and out with great safety. The channel is not more than 2 cables' length wide, and there are 13 to 14 fathoms midway between the rocks that form the passage, and 7 fathoms close to the rocks on either side of it. If bound out through this passage, from Quiberon Bay, bring St. Gildas Monastery to bear E. by N. by compass; then steer West or W. by S. There are three small rocks lying from the N.W. end of Houat about a musket-shot, which you are to leave on your port or larboard side.

The tide sets directly through this passage, that is in an E. by N. and W. by S. direction, with greater strength than it does in the Teignouse Passage.

The S.E. end of Belle Isle bears from this passage S.W. $\frac{1}{4}$ W., and the N.W. end of the same island bears W.N.W. By these bearings you may shape your course for either side of Belle Isle, but if you go to the southward you must be careful to avoid the outermost ledge of the Chaussée de l'Ile de Chevaux, the marks for which have been already given.

From the eastern point of the island a bank of 3 to $3\frac{1}{4}$ fathoms extends in an E.S.E. direction about $2\frac{1}{4}$ miles. It is named the Bank of Houat, and bounds Haedik Road on the northern side.

HAEDIK ISLAND, with its group of rocks, lies about $3\frac{1}{4}$ miles from Houat Island, being separated from it by a narrow and intricate channel, named Les Sœurs, through which the tide sets with considerable strength. The depth here is from 5 to 7 fathoms, but as there are numerous patches of much less water, a stranger should not attempt to run through, unless guided by an experienced pilot.

The island is about a mile in extent, and produces excellent water. Shingle-ballast can also be obtained here, and fine sand in abundance. It is surrounded by rocks and foul ground to a considerable distance, many heads of the ledges appearing above water when the tide is down. To the S.E. of the island, about $1\frac{1}{2}$ mile distant, is a group of rocks named the Cardinals, many of which are always above water. The extremity of these rocks bears from the south-eastern end of Belle Isle about E.S.E. $\frac{1}{4}$ E., distant 11 miles.

The lighthouse upon the island stands about 601 yards to the westward of the eastern point, and shows a single fixed light at 85 feet above the sea, visible 9 miles. The building is 39 feet high, and was erected in the year 1836. It is high water here, on the days of full and change, at 3h. 40m.

Should your vessel be driven to the eastward of Belle Isle, you must give the Cardinals a good berth,* and may then haul up to the northward for anchorage. In Haedik Road there is good riding in from 8 to 12 fathoms, upon a bottom of clear soft clay and mud, with the Cardinals bearing from South to S.S.W. With these bearings you will be shut within a bank of 7 to 10 fathoms, named De l'Artimon, and which consists of foul ground, having an extent of about three miles. This bank bears from the Cardinals E. by N. to N.E. and is very destructive to the cables of vessels.

* It is requisite to give the Cardinals a wide berth on account of some shoal spots lying about three-quarters of a mile from them. A shallow patch of 3 fathoms, named the Basse des Cardinaux, lies S.S.W. of the rocks, distant nearly a mile. There are 11 fathoms all round it, so that great care is necessary to avoid it. In 1842 a vessel named the Pearl, from Nantes, was reported to have struck upon a sunken rock, bearing from Haedik S.W. $\frac{1}{4}$ W., distant 3 miles. But this danger is scarcely likely to exist, the French surveyors having found 18 to 20 fathoms hereabout.

QUIBERON BAY is extensive, being from 3 to 4 leagues in extent; that is, from the Islands of Haedik and Houat to Point St. Gildas, and you may sail within gun-shot of either. In the northern part of the bay are the towns of Vannes, Noyallo, and Auray, and vessels approaching them should pass to the eastward of the Cardinals.

To the northward of Houat Island there is good anchorage, also from hence to Morbihan. Excellent anchorage is also found in the north part of the bay, under Quiberon Peninsula, by bringing the Teignouse Rock to bear from W. by S. to S. W. by S. The place to lie in is about midway between the rock and the coast of Vannes, towards Mount St. Michael, in from 10 to 11 fathoms, mud and sand. There is very little tide in the bay.

The course, from the east end of the Cardinals, for the Rivers Auray, or Vannes, is N. $\frac{1}{2}$ E., $4\frac{1}{2}$ leagues, the entrance to both being the same; on the west of which is a rocky bank, with the small Islands of Meaban, that extend 3 miles from the land, in a southerly direction. Having arrived within the island, which are left on the port or larboard, proceed towards the eastern shore, in 7 and 8 fathoms, and when within the east point, you will perceive the two rivers. These have always a rapid current, and should not be attempted without a pilot.

Upon Point Novallo, on the south side of the entrance, is a fixed light at 72 feet above the sea, visible 9 miles. It is high water here on the days of full and change at 3h. 45m.

From Point Novallo the coast bends to the southward, a distance of 4 miles, to Point du Grand-mont, near which is the Monastery of St. Gildas. From this point a bank of $3\frac{1}{2}$ and 4 fathoms extends nearly 3 miles in a W. by N. direction. It is named the Plateau du Grand-mont, and has numerous shoal spots upon it, the outermost of which is named the Basse de Thumiac, and has but $3\frac{1}{2}$ fathoms upon it. This lies right before the entrance of Morbihan, at the distance of about 2 miles from the bar, with Point Novallo in one with Badene Church, and St. Gildas Monastery in one with Trest Mills, bearing E. by S. Between this patch and the Bar of Morbihan there are two other small spots of 2 and 3 fathoms.

Within the Basse de Thumiac towards Point St. Gildas, there is another shoal of but 2 and 3 feet water lying with the monastery bearing E.S.E., distant $1\frac{1}{2}$ mile. It is named the Basse de St. Gildas, and has 12 to 13 feet between it and the shore. There is another small bank, named the Basse du Grand-mont, having 5 feet upon it and a rock which dries when the tide is down, lying three-quarters of a mile from Point du Grand-mont, with St. Gildas Monastery bearing N.E. by E., distant one mile, and Lomariaker Church and Point Novallo in one, bearing N. by W. $\frac{1}{2}$ W.

At rather more than a mile to the south-eastward of Point du Grand-mont is Point Bauzec, off which is a rock which dries and is connected to the shore by a rocky ledge. About a mile farther on is Point St. Jacques, which is foul some distance off, and has a shoal of $1\frac{1}{2}$ fathom at a mile to the S.S.E. of it, named the Basse de St. Jacques. Between this shoal and the land are 13 to 20 feet, and outside it, a little off, about $3\frac{1}{2}$ fathoms.

About 3 miles to the southward of Point St. Jacques, is an extensive shoal, running for an extent of nearly 5 miles in a direction parallel to the coast. It is named the Plateau de la Recherche, and is in breadth about half a mile, the general soundings on it being $3\frac{1}{2}$ to 7 fathoms, although there are places where there is a much less depth of water. The west end of the shoal, in 4 fathoms, lies about $4\frac{1}{2}$ miles, S. by W. $\frac{3}{4}$ W., from St. Gildas Church, and $5\frac{1}{2}$ miles, N.E. $\frac{1}{2}$ N., from the lighthouse on Haedik Island, with Lomariaker Church open $2^{\circ} 30'$ to the left of Port Novallo Point. From thence the

Kay of La Chaume, upon the western side of the entrance; and there is, also, a harbour-light on the head of the great jetty upon the eastern side. The light on the jetty in a line with that of La Chaume, gives the direction of the channel into the harbour. Both lights are fixed; that of La Chaume is 118 feet above the sea, and may be seen 10 miles off, and that of the jetty is but 23 feet high, and visible 9 miles off.

From hence to Pertuis Breton, or Breton Passage, the coast runs S.E. by S., about 6 leagues, and is low all the way, but with many rocky points running off it.

THE ISLE DE RE lies about 18 miles to the southward of Les Sables d'Olonne. It is about 13 miles in length, from E.S.E. to W.N.W., and is generally sterile. St. Martin, the principal place, is on the N.E. coast, and is protected by forts. At this place there is a harbour-light, coloured red, on the port side of the entrance; it is fixed, 52 feet above high water, and may be seen at 6 miles off. The north-western point of the Isle de Re is distinguished by a revolving light, the interval of revolution being three-quarters of a minute: the light is elevated 85 feet above the sea, and may be seen 6 leagues off. From this point a great ledge of rocks, named Les Baleines, or the Whales, extends to the distance of three-quarters of a league. There are other reefs on the S.W. side, which extend outward to the distance of half a league, but they diminish thence to the S.E. end of the island.

On the rocks of the Point de Chauveau, the S.E. point of the Isle de Re, is a fixed light, visible 14 miles. As the light must always be in sight, whenever the harbour-light of La Rochelle can be seen from seaward, they will readily be distinguished from each other by their appearances and bearings.*

PERTUIS BRETON, or the **BRETON PASSAGE**, is the space between the Isle de Re and the main. On Point Grouin du Cou, on the north side of the channel, is a fixed light at 59 feet above the sea, visible 9 miles; and, farther in, on the low Point of Aiguillon, forming the north side of Maran Bay, is a similar light, at 33 feet above the sea, visible 9 miles.

In running into this passage, steer in mid-channel with the light on Point de l'Aiguillon bearing S.E. by E., until the light on Point Grouin du Cou bears N.N.W. Steer then a S.S.E. course, until the Church of St. Martin bears S.W., when you may bear up towards the Isle de Re, and anchor, if necessary, before the town, in from 3 to 5 fathoms, sand and mud; but should the wind be contrary, you must be careful to avoid the Bank of St. Martin, which runs eastward from the Isle de Re into the middle of the channel, and has on it but from 1 to 3 fathoms. There are some rocks lying off La Tranche, which form the port or larboard side of Pertuis Breton in entering; these run nearly a mile into the sea, and require a berth. There is also shoal water extending from these rocks to the Point of Aiguillon, to the distance of 2 miles from the shore, narrowing the channel between it and St. Martin's Bank to about $1\frac{1}{2}$ mile.

The anchorage in the Bay de l'Aiguillon has always been considered the most certain place of shelter in the neighbourhood of Rochefort and La Rochelle. The surveyors in 1824 considered that the water and the extent of the anchorage were fast diminishing, but stated that it was always a very excellent place for vessels to run for when deprived of anchors or dismasted, as they might run aground there in perfect safety. In running for this place, the Aiguillon shore should not be approached nearer than $1\frac{1}{2}$ mile, in order to avoid the bank which extends outward to that distance, and which consists

* La Rochelle Light is so placed, that the Chauveau Rocks and the Lavardin Reef will be avoided by keeping the light open to the southward of the lantern-tower, which stands twenty-three yards to the westward of it.

of sand, dry at low water. When the lighthouse bears N.E. by E., haul up towards it and anchor in 3 or 2½ fathoms, or you may run into the bay and run ashore where you please, as the bottom consists of soft mud. The channel in is narrow, and shoalens rapidly as you approach the lighthouse.

In sailing up the Pertuis Breton, and drawing only 9 or 10 feet water, you need be under no apprehension about the outer part of the Bank of St. Martin, as it is not very dangerous, being soft, and having always water enough upon it for you to pass without danger; but the inner part is rocky, with only 5 feet water on it, at 1½ mile eastward of the beacon on Point de Loix. Large ships generally wait for the tide. In working, either at entering or going out of Pertuis Breton, observe the following marks, by which you will avoid the Bank of St. Martin.

When you run along the north-eastern coast of Re, and perceive the first houses of the Village of Loix in one with Ars Steeple, then tack; for should you proceed until the said steeple comes on with the middle of the village, you will be upon the bank. You may sail along the coast of the main land in 8 and 6 fathoms; for outside of the bank, and in the middle of the channel, you will have 10 to 12 fathoms; but when you have brought the above-mentioned steeple in one with a mill standing at the southern extremity of Loix, you will be within the bank, and may steer into the road, and anchor in 3, 4, or 5 fathoms.

Large vessels bound to Rochelle, should not run up this passage as from Aiguillon, or Maran Bay, a flat of ¼ to 2 fathoms runs across the channel to Re Island, thus connecting the southern part of the island with the main land.

PERTUIS D'ANTIOCHE lies between the Isle de Re and Oleron Island. On the south-western side of the Isle de Re are several rocks which extend outward nearly a mile. At the Village of Ars, the rocks, named Chanchardon, extend in a southerly direction, nearly 2½ miles, and the whole coast of the island thence to the south-eastward is lined with a rocky ledge, which diminishes in extent as you get towards the extremity of the island. The S.E. end of Re is bold-to, and near it is a depth of 7 fathoms, but a shoal spit extends from the opposite side; and farther to the southward is a small rocky bank, named the Lavardin, which is dry at low water. It lies about 1½ mile, S.E. by E., from the S.E. end of the island. A white stone beacon, 33 feet above high water, which has been recently constructed on it, will indicate its situation by day. The extremities of Aiguillon Point and the South Point of Re in a line, will lead clear of it on the west.

Ships may round the Lavardin in a good depth of water. Between it and the Isle de Re are 5 and 6 fathoms.

THE ISLE OF OLERON is about 16 miles long, and 5 to 6 miles wide in its broadest part, which is near the centre of the island. It is almost entirely surrounded with banks and rocky reefs, which, on the western side, extend a considerable distance from the shore; there are also extensive flats of sand and mud on the eastern shore, which dry at low water. Between the island and the main land are numerous shifting sands, so that, when running within it, great caution is necessary. On the north-west extremity of the island, named Point Chassiron, is a lighthouse, showing a fixed light at 164 feet above high water, visible 18 miles. The rocks which surround this end of the island, are named the Antioche Rocks: they extend 2 miles to the eastward of the lighthouse, and dry in many places at low water, but within them there is anchorage, which should not be attempted by strangers.

On sailing into this passage, which is nearly 2 leagues in width, it is safest to keep over to the *Isle de Re*, until near the S.E. end of the island, only taking

care to avoid the Lavardin before-mentioned. Then steer for the west part of the Isle of Aix, a flat island, which lies about half-way between Oleron and the main land. The soundings in mid-channel, between the Islès of Re and Oleron, are from 12 to 15 fathoms, shoaling toward each side. In using this channel, when bound for Rochelle, give the Isle de Re a sufficient offing to avoid the Lavardin, till you have a lantern-tower in view; the tower must not be brought on with the Point of Chef de Baye, because this mark leads directly on the Lavardin, which lies also with the Points of La Plomb and La Repentie in a line. To enter the Harbour of La Rochelle and the Charente, or River of Rochefort, a pilot is indispensable.

HARBOUR LIGHTS.—At 45 feet to the eastward of a lantern-tower, on the north or left side of the entrance of Rochelle, there is now a harbour-light. It is a fixed light, at 46 feet above the sea, and may be seen at 10 miles off. If kept open to the southward of the lantern-tower, it leads clear of the Lavardin.

There is also a harbour-light on the fort on the south point of the Isle d'Aix, which is fixed, at 56 feet above the level of the sea, and may be seen at the distance of 10 miles. This light, bearing S.S.E. $\frac{1}{4}$ E., leads up the fairway of the Antioche Passage, clear of the shoals on the N.E. of Oleron, whence you round into the Road of Aix, south of the island.

The passage between the southern end of Oleron Island and the shore, is named the Maumusson Channel. It is through banks of shifting sand, the direct channel through which does not always remain the same. The bar shifts almost daily, and the direction which it is necessary to follow, cannot always be indicated by the beacons erected for that purpose, of which one is fixed and the other moveable. But it is generally the heavy sea, more than the depth of water, that renders the bar so dangerous for vessels.

TIDE.—The vertical rise of tide hereabout, on the full and change, is 10 feet. The time of high water in the Passages of Breton and Antioche, is 3h. 15m.; on the Isle of Re, 3h. 30m.; in the Harbour of Rochelle, and at Brouage, S.E. of Oleron, 3h. 45m.

THE ROCHES BONNES is one of the most dangerous shoals on the west coast of France. It lies about N.W. $\frac{1}{4}$ W. from Chassiron Lighthouse, on the north-western extremity of Oleron Island, distant 42 miles, and S.W. by S. from Isle D'Yeu, distant 30 miles, and consists of a rocky shoal of about 8 miles in length, and 2 in breadth, extending in a N.W. by N. and S.E. by S. direction. Upon it there are several heads of rocks, with only 10 feet over them at low water; the sea also breaks heavily upon them, especially in blowing weather. This rocky shoal is situated between the parallels of $46^{\circ} 10'$ and $46^{\circ} 18' N.$, and the rock at the south-east extremity of the bank, upon which there are only 18 feet at low tide, lies in lat. $46^{\circ} 11' 25''$, and long. $2^{\circ} 25' W.$, according to the determination of M. Beaupré in 1825.

Considerable caution is necessary when navigating in the vicinity of this rocky bank, as close to it all round is deep water. A little to the eastward of it are 25 to 30 fathoms, red sand and shells, and to the northward and westward the soundings deepen quickly to 50 and 60 fathoms, bottom of soft ground.

The rocky bottom, to the north of the Roches Bonnes, is named, by the fishermen of the neighbouring coast, the Banche Verte. It is not dangerous, neither is there anything to cause anxiety. To the westward of this, the ground consists of soft mud.

At the Roches Bonnes it is high water, on the days of full and change, at about 5½h., the tide rising 10 to 14 feet. In the neighbourhood of the rocks

the tide runs with considerable strength, the flood from the S.S.W., and the ebb from the N.N.E., at nearly 2 miles an hour.

RIVER GIRONDE.—From the Maumusson Channel the coast runs to the S.W. $\frac{1}{2}$ S., about 6 miles, to Point de la Coubre, at the northern side of the entrance to the Gironde River. The shore is low all the way, and shoal some distance out, so that it is necessary, when making the river, to give it a good offing, more especially as a bank of 2 to $3\frac{1}{2}$ fathoms, named the Demi Bank, runs out 3 miles to the westward of Point de la Coubre. A mark to avoid these banks is, not go within the line of the beacon, on the south shore of the Maumusson Channel, bearing E. by N.

The entrance of the river is readily distinguished by the Tower of Cordouan, which stands on a bed of rocks nearly midway of the entrance, and has long been esteemed the most elegant structure of the kind in Europe. It exhibits a revolving light, at the elevation of 207 feet above the level of the sea, visible 8 leagues. The eclipses of this light succeed each other at intervals of one minute, every bright flash being preceded by a flash less brilliant. In ordinary weather, the eclipses do not appear total within the distance of 8 miles.

Point de la Coubre is low, with some sand-hills rising inland. Upon it there is a small lighthouse, which shows a fixed light at 66 feet above the sea, visible 10 miles. From hence the land bends to the eastward about $3\frac{1}{2}$ miles, and then runs southerly 2 miles farther, forming a small bay, in which is a dangerous bank named the Barre a l'Anglais, upon which there not more than $2\frac{1}{2}$ to $3\frac{1}{2}$ fathoms, and in some places very much less water. Near the point there are a small battery, a semaphore, and two beacons, with lozenge heads.

At 5 miles farther in the river, is the Point and battery of Terre-Negre, with a beacon-tower and light by night. This light is fixed at 118 feet above the sea, visible in clear weather about 10 miles, and can be seen only southward of the line of the Towers of Terre-Negre and St. Palais in one.

Beyond Terre-Negre, to the eastward, are the Mill, Church, and Village of St. Palais, and between 2 and 3 miles farther are the Column and Semaphore of Chay, with a beacon and the conspicuous church of Royan. At Royan there is a small fixed tide-light, situated on the point of the Corps de Garde, at 559 feet from the end of the jetty; it is 36 feet above the level of the sea, and can be seen about 2 leagues.

At 2 miles above Royan, at the back of a sandy cove, are the Village and Mills of St. George de Didonne; and at half a league southward of this is the Point of Suzac. At a mile and a quarter above Suzac Point, on the shore, is the Semaphore de Bel Air; and within a mile higher are the Village, Church, Mills, and Forts of Mechers.

Opposite to the Cove of Royan, on the western bank of the river, is the Point de Grave, with its fixed light, which is shown from a wooden building at 39 feet above the sea, and can be seen 9 miles; and, at 2 miles without this, on the sea coast, are the Beacon and Semaphore of St. Nicolas, which serve as a mark for the Passe de Grave. At 2 miles to the southward of Point de Grave, on the river, is the Village of Verdon, with its mill, &c.

There are many towns and villages situated upon the banks of the Gironde, but no trading-place of any consequence until we reach the small town of Pauillac, situated on the western shore, at about 25 miles from Point de Grave. Here a small tide-light is shown from the landing-place, which can be seen about 4 miles. About 5 miles farther in the river, but on the opposite side, is the Town of Blaye, remarkable for its castle or citadel, protecting the river, which is here impeded by a long range of islets or shoals. Here there is also a tide-light, which is fixed, and can be seen at the distance

of 4 miles. On the opposite site bank of the river is the strong Fort of Medoc, which commands the western channel. At 7 miles above Blaye, is the conflux of the Rivers Dordogne and Garonne, the united streams of which form the Gironde. Above this junction of rivers, at the distance of 13 miles, and seated on the western shore of the Garonne, is the commercial City of Bordeaux.

The banks at the mouth of the river, occupy a space of about 12 miles in a northerly and southerly direction, and are extremely dangerous throughout their whole extent.

THE PASSE DU NORD, on the northern side of the mouth of the river, has a bar running across its entrance, upon which there are not more than 28 to 30 feet at low water; its general breadth is about one mile, and within it the water deepens to 6 and 12 fathoms. This channel is bounded on the northern side by the Demi Bank, which extends to the westward from Point de la Coubre, and by the Barre à l'Anglais, both of which banks have already been described. On the outer edge of this last-mentioned bank is a depth of from 2 to $3\frac{1}{2}$ fathoms, but within it, in the Bonne Anse, there are 6 to 8 fathoms; and vessels must carefully avoid getting embayed in this, as it forms a cul-de-sac.

On the south side of the Passe du Nord, off the Point de la Coubre, is La Mauvaise Banc, having on it $2\frac{1}{2}$ fathoms, and which contracts the passage here to little more than half a mile. The southerly continuation of this shoal is named Le Grand Banc, which is joined on to the S.E. by the Plateau de Cordouan, in the midst of which is the celebrated lighthouse. On the N.E. side of the Plateau is the Monrevel Bank, which limits the channel on the south, having a depth of only three-quarters of a fathom, at a mile and a quarter W.S.W. of the sandy point below Terre-Negre, which is about 5 miles above Point de la Coubre. Hence the channel is wide and clear up to Point de Grave, the southern entrance to the river. Off this latter point is a shoal of 4 fathoms, extending a mile N. of the point, named Le Saut de Grave. The depth throughout the channel varies from $4\frac{1}{2}$ to 5 fathoms.

This was the state of the Passe du Nord at the period of the survey in 1825, but it has been remarked by the surveyors that "this fine passage is limited by sand-banks, which shift their position; from which cause it would be imprudent to attempt to take in a large ship without the aid of a river pilot (*pilote lamaneur*), both on account that buoys do not mark the outer entrance, and of the north point of the Mauvaise Bank, and of the western point of the Barre à l'Anglaise."

THE PASSE DE GRAVE, the southern passage, lies between Le Chevrier, a patch with only 3 feet on it at low water, lying 4 miles westward of the Beacon of St. Nicolas, and the Banc des Olives, an extensive bank extending $2\frac{1}{2}$ miles off-shore, on the outer edge of which are from 2 to 4 fathoms, but having patches with little more than a fathom in different parts.

The Passe de Grave is not deep; but navigators who cannot procure pilots have reason to prefer it to the Passe du Nord, because its entrance and direction are well marked by objects on land; and it is also of small extent, and can be cleared in a few hours. The entrance of the channel is exactly in the direction of St. Nicolas Beacon and Semaphore in one, and the interior part of the channel, of the Tour du Chay in one with St. Pierre de Royan; and if these marks are followed exactly, there will be found at least a depth of 12 feet at low water, spring-tides, in the shoalest parts; but if it is unavoidable that the true direction must be departed from, there must not be a greater *depth than 8 feet* calculated upon. The nature of the bottom in the *Passe de Grave would lead to the belief* that the depth in the channel varies but little.

It has been recently observed, that when the weather is hazy, and when there is the appearance of a calm, vessels should avoid entering the river, because at such times a heavy swell of the sea will frequently arise in an instant. This phenomenon is called by the pilots *Le Brume Sèche*, or the Dry Fog: it is a sort of mist, accompanied by a calm, which is invariably followed by a great swell in all the channels.

M. Beautepts Beaupré advises mariners going into the River Gironde through this passage,* not to approach the Plateau de Cordouan nearer than when the Church of Royan is seen on with the Tour du Chay; and also to avoid going too far away from this directing mark on the eastern side; because the stream of flood comes with such great force upon the coast of Medoc, that in many cases it will be almost impossible to keep the vessel thoroughly under command.

He says further that "the pilots of the Gironde are not well acquainted with all the dangerous points in the *Passe de Grave*; but experience has taught them all that are essential, which they know how to avoid. They know and are well aware—

1st. That the two directions of the Passage are well marked, viz., the exterior part of the channel by the Semaphore of St. Nicolas, and the Beacon placed at the foot of the Downs; and the interior, or northern part of the channel, by the Church of St. Royan and the Tour du Chay.

2dly. That they cannot reckon upon more than 12 feet depth at low water.

3dly. That they should not, in tacking, incline to the westward of the mark given of St. Pierre de Royan Church in one with the Tour du Chay, for fear of falling on the rock of the Chevrier, or of the Ruffiat.

4thly. That when the wind is favourable for them to make the direct route, they must steer so as to keep the Tower of St. Pierre de Royan open its own breadth to the right of the Tour du Chay.

5thly. That they ought not to venture too near to the coast of Medoc in tacking, on account of the current of flood setting so strong on that shore, rendering it extremely dangerous to anchor any where, although there are many places where the points are sandy.

6thly. That they should never attempt to leave the river by this channel with a large ship, except when the tide is rising, and the wind favourable.

7thly. That they must never anchor in the *Passe de Grave*, unless unavoidable.

8thly. That at all times a preference should be given to the *Passe du Nord*, either going into, or sailing out of, the Gironde, when circumstances will allow them to take their choice, as the depth is greater, and particularly as the ground is good for anchorage in all parts.

In 1815 a beacon was erected upon Fort du Chay, but it has since fallen; and the sands having in some places grown up and altered since that time, it will be of no use to replace it, as it would now lead too near to the shores of Medoc. Another beacon was placed at the same time near St. Palais, which being seen in one with the Tower of St. Palais, was a third direction to enable you to pass through the interior of the *Passe de Grave*, within the Gironde; but this beacon can hardly ever be seen when you are in the southern part of the *Passe de Grave*: it is therefore of very little use; first, because it gives a direction across the current, and, for this reason, it would always be very difficult to follow; farther, it would lead you over shallows, over which the sea is more dangerous than among those found to the eastward, in the direction of St. Pierre de Royan on with Tour du Chay: even

* *Avis aux Navigateurs sur l'état actuel des Passes de l' Embouchure de la Gironde.* Paris, 1826.

the pilots avoid keeping this mark of the beacon on with the Church of St. Palais.

To the above, M. Beauteemps Beaupré adds, page 18, "that to pass into the interior channel by the Passe de Grave, you must, after passing the Ruffiat, continue to steer in the direction of the Church de Royan on with the Tour du Chay, until you have doubled a great cluster of rocks and gravel, which runs out from the Point de Grave, stretching into the river more than 1100 toises N. 10° E. (true), or nearly N. E. by N. by compass, from the beacon which stands upon this point. This cluster, which the pilots name Le Saut de Grave, the sea constantly breaks over; and they do not appear to have been mentioned on any of the former charts. There is no fear of your touching thereon, even with a large vessel, because there are 27 feet over them at low water; but the rough seas which, in bad weather, you will occasionally encounter, may be likely to do your vessels some serious injury.

In 1846 the following notice was issued from the Port of Bordeaux;—

ENTRANCE OF THE GIRONDE.—High water at Cordouan, on the full and change days of the moon, at 3½ to 4 o'clock. Several buoys have been placed at the entrance of the Gironde; but as no instructions whatever have been published for the guidance of navigators, the following indications have been collected, and lately rectified, with the assistance of the ablest branch-pilots, by Serizier and Lafitte, ship-brokers, for the information of captains of vessels, who may not happen to find pilots off Cordouan Lighthouse.

NORTH CHANNEL.—In the North Channel are 7 buoys, the 1st of which is a red can and fairway buoy, with a staff about 15 feet long, and a small bell at the top, placed in about 40 feet water, in the middle of the channel, about 9 miles N.N.W. of Cordouan Lighthouse,—the lighthouse on the Point de la Coubre bearing E.S.E., 3° South, distant about 4 miles. The straight course in is S.E. by compass, and you will soon come up with the 2nd red nun-buoy, to be left on the starboard side. A nun-buoy, about half a mile S S.E. of the above buoy, in 30 feet water, on the eastern part of the bank named La Mauvaise; it must be left on the starboard side, distant a cable's length, or rather more when the wind comes from the eastward, the lighthouse on Point de la Coubre bearing E. by S. When the lighthouse of La Coubre bears due North by compass, alter your course to full S.E. ¼ S., and you will soon perceive the first of the 3rd and 4th black can-buoys, to be left on the port or larboard side.

Two black can-buoys, placed at nearly a mile distant from each other, on the bank, named the Barre à l'Anglaise, both to be carefully left on the port or larboard side, coming in. The first of them is placed on the northern point of the bank, Cordouan Light bearing S. by W. 4° South, and the lighthouse of Point de la Coubre at N.N.W. The second of these buoys lies nearly a mile inside, on the southern point of the said bank, Cordouan Light bearing S.S.W. 2° South, and the light of Point de la Coubre N.W. by N. Both these buoys are to be left on the port or larboard side; the first at a good cable's length, and the last at about 2 cables' length distant. After passing the first of these two buoys, you will perceive, on the starboard side, the 5th and 6th red nun-buoys; these are to be left on the starboard side.

Firstly one, and farther in another nun-buoy, placed on the Montrevel Bank, the first of which is in 36 feet water, Cordouan Light bearing S. by W. 4° West; the other in 32 feet water, Cordouan bearing S.S.W. ¼ W. Both these buoys are to be left on the starboard side, at 1 or 2 cables' length, according to wind and sea.

The 7th is a white can-buoy, to be left on the starboard side. This 7th buoy is placed on a bank, about a mile N. ¼ W. of the Tower on Point de

Grave, in about 10 feet water ; to be left on the starboard side, distant about 2 cables' length.

PASSE DE GRAVE.—In this channel are 4 can-buoys.—1st.—Red can and fairway buoy.—One large can-buoy, painted red, having a staff about 15 feet long, with a small bell at the top ; it lies in the middle of the channel, about 7 miles S.W. of Cordouan, and 2 miles outside the Chevrier Rocks, in a straight line with the two Towers of St. Nicolas, on the beach, due East by compass, which direction is to be followed until you come up to the

2nd.—Can and fairway buoy.—A can-buoy, which is smaller than the 1st, painted red. This lies also in the middle of the channel. When you are up to it, alter your course, and steer E.N.E. by compass, in the line of the Steeple of Royan, which must be kept at 2 sails' breadth to the southward of the Tour du Chay ; steering thus, you will come up with the 3rd, a black buoy.

3rd.—Black can-buoy, lying near the Ruffiat Shoal ; it must be left on the port or larboard side, at about 2 cables' length. Next, at a distance of about half a mile, you will perceive on a newly formed shoal, the

4th.—A white can-buoy, lying N. $\frac{1}{4}$ W. of the tower on Point de Graves, as already described in the North Channel Directions, which is also to be left on the port or larboard side, observing it is necessary to be rather nearer the shore than this shoal.

ESSENTIAL REMARKS.—The different bearings are here indicated by compass, and the depths of water invariably at low water mark.

The various directions of the current at the entrance of the Gironde, should be particularly noticed. It generally runs on the first of the flood to the northward ; at half flood to the eastward ; at two-thirds flood towards the south-east ; at high water to the southward ; on the first of the ebb to the southward ; at half ebb to the westward ; and at two-thirds ebb towards the north-west

As ships are liable to severe penalties by the Custom-house laws of France, for any articles, though belonging to the crew or passengers, especially for prohibited goods found in part of the vessel, if not regularly entered in the manifest, or list of stores, no pains should be spared to ascertain and report the same, before leaving the quarantine ground.

On the arrival of vessels at the lazaretto, the Custom-house requires a duplicate manifest of the cargo, stores, and anything else that may be on board, which must all be reported, but pays no duty if not landed. The principal articles are—bread, flour and meal, beef and pork, spirits, wine, beer, coffee, tea, chocolate, sugar, molasses, spices, fish, salt, cheese, candles, tobacco, cigars, snuff, paints, oil, canvas, medicine chest, arms, gunpowder, cordage, chronometers and barometers, extra anchors and chains, live stock, &c., ballast of whatever kind, fire-wood or coals.

RATES OF STEAM-BOAT HIRE TO TOW VESSELS UP TO BORDEAUX. From 200 to 350 tons :—From the Lazaretto 400 fr. ; Pauillac 350 fr. ; Blaye 300 fr. ; Larroque 260 fr. ; Parque 220 fr. ; Lagrange 200 fr. ; Bassens 120 fr. ; and Lormont 100 fr. From 350 to 500 tons :—From the Lazaretto 450 fr. ; Pauillac 400 fr. ; Blaye 350 fr. ; Larroque 320 fr. ; Parque 280 fr. ; Lagrange 240 fr. ; Bassens 150 fr. ; and Lormont 120 fr.

It is not obligatory to employ steamers ; that expense can be, and is frequently, avoided without losing time, especially at spring tides.

Inside the river are the following lights ;—a light-vessel, on the middle of the eastern edge of the Tallais Bank, which forms the western side of the channel, the eastern side being formed by the Talmont Bank. It is moored in 4 fathoms, with the Point de Grave Light bearing N. by W. $\frac{1}{4}$ W., distant 5047 fathoms ; Talmont Steeple E. $\frac{1}{4}$ N., 3527 fathoms ; and Richard red

Light, S. $\frac{1}{4}$ E., 4484 fathoms, and exhibits a fixed light at 33 feet above the surface of the water, visible from the deck of a pilot-boat about 9 miles off. The vessel is readily distinguished by a skeleton ball at the mast-head, the centre of which is 46 feet above the surface of the water, and a bell is also kept ringing during fogs. It should also be observed, that the light is so masked that it cannot lead into the channel to the westward of the Tallais Bank.

On the western bank of the river, at a little below the small Port of Richard, is a red fixed light, shown at 56 feet above the level of high water, and visible about 8 miles. The light vessel on the Tallais Bank bears from it N. $\frac{1}{4}$ W., distant 4484 fathoms, and Jau Steeple W.S.W. $\frac{1}{4}$ W., 2184 fathoms.

To run into the Passe du Nord in the day-time, the mark is St. Palais Steeple exactly in one with St. Pierre de Royan, which will lead over the bar in the best water, and when abreast of Point de la Coubre, with the lighthouse distant about three-quarters of a mile, you steer S.E. $\frac{1}{4}$ S., which may be continued for $8\frac{1}{2}$ miles, until the Church of St. Palais bears North, about half a league distant. From the last spot a S.S.E. course, $6\frac{1}{2}$ miles, will bring you up to Mecher's Road, where there is good ground of sand and mud, and from 8 to 10 fathoms at low water.

Should circumstances require it, you may run up and take shelter under the Point de Grave, which affords a safe retreat during westerly and S.W. winds. The mark is Royan Steeple and Mills N.E. $\frac{1}{4}$ N. At this place, between Verdon and the bank named the Taille Fer, coasting-vessels are commonly sheltered in bad weather.

In making use of this channel by night, having arrived south of the Point de la Coubre, and the small fixed light on that point having been brought to bear N.N.E. by compass, the route must be changed; and then steer toward the Cordouan Light, until the moment the light on Terre-Negre is first perceived; then steer towards it, keeping as near as possible in the line of its direction, which will be S.E. $\frac{1}{4}$ S., until the Cordouan Light bears S.S.W.; after which change the route for the third time, and bear S.E. $\frac{1}{4}$ S.

It is very essential to remark, that the Light of Terre-Negre, not being visible to the west of the Point de la Coubre, on the direction for entering the Passe du Nord, will not be of any service until that point is doubled. Another observation which cannot be too much insisted on, is, that notwithstanding the facilities offered to vessels by the new light on Terre-Negre, for avoiding the Barre à l'Anglais, they should never attempt to enter the Gironde at night, except in cases of absolute necessity, seeing that the dangers are then multiplied, and that the fog often prevents the lights from being seen.

The Passe de Grave is about 12 miles to the southward of the Passe du Nord, and is $2\frac{1}{2}$ leagues in length. As already observed, in its shoalest part, there are commonly about 18 feet of water, but spots have been found of only 11 feet; and there is one rock of only 7 feet, lying 1,700 fathoms N.W. by W. from the Semaphore of St. Nicolas. It is also to be noticed that there is a flat of rock and gravel, extending N.W. from the coast of the Point de Grave to the distance of more than a mile, but on its edge is a depth of 27 feet, and no danger unless in rough weather.

If a pilot cannot be had, you may enter the Passe de Grave with the beacon on the sand-downs in one with the Semaphore of St. Nicolas, bearing E. $\frac{1}{4}$ S. as above, and may carry this mark on until the Steeple of St. Pierre de Royan (open to the right of the semaphore of that place) comes in a line with the beacon bearing E.N.E. The last mark kept well on will lead into the main *stream of the river*, and at the distance of nearly a mile from the Point de

Grave. Hence you haul round the point to the eastward, according to circumstances. In going through the Channel de Grave, be cautious of advancing too near the shore, as the tide of flood sets strongly upon it, and never, if avoidable, attempt to anchor in it. No large vessel should attempt to leave the river by this channel, unless with rising tide and favourable wind.

TIDES.—At the entrance of the Passe de Grave, with the Cordouan Tower bearing N.E., the tides set as follow:—First of the flood, North; one-third flood, N.E.; half and two-thirds flood, E.N.E. First ebb, S.E.; one-third ebb, South; half and two-thirds ebb, West. In the channel within, with Cordouan bearing N.N.W., the flood sets, generally, E.N.E., and the ebb W.S.W. Between the Great Bank of Cordouan and the Point de Grave, the flood sets, generally, S.E.; the ebb from West to W.S.W.

The tides, both ebb and flood, set through the different channels with rapidity; and great caution is, therefore, requisite, on making the river. Should the land-marks be obscured by thick weather, or if night comes on, it will be prudent to anchor in the first convenient spot, only noticing the precautions above.

It is high water, on the full and change, northward of Cordouan, at 4h. 30m., and southward of Cordouan at 3h. 45m. The perpendicular rise of spring-tides is 14 or 15 feet; and of neaps, 7 or 8 feet. The tides during the months of May, June, and even a part of July, are very small; but the Magdalen tides (22nd July) are often as high as those of the equinoxes, which rise to 17 or 18 feet. The winds have a great influence on the tides, and, in general, you may depend on a good tide when the wind blows strongly into the river, and a lesser one must be expected with a strong wind blowing seaward.

ARCACHON BASIN.—From the entrance of the Gironde the coast runs S.S.W. $\frac{1}{2}$ W., about 19 leagues, to the Basin of Arcachon, and consists throughout the whole extent of low sandy downs, with a cluster or two of trees. At a short distance inland, but parallel to the shore, are two remarkable ponds or lakes, the northernmost of which is named the Carcans, and the southernmost the Canau Lake; this latter has a communication, by a small rivulet, with the Basin of Arcachon.

Although extensive, this basin is too shoal for a place of much resort. Its banks block up the entrance, with the exception of two small channels, known only to the inhabitants and pilots. The breakers at the entrance may always be seen; the soundings towards them diminish gradually; and the place may be known by its low level land, destitute of trees on the north side; and the high downs appearing like mountains on the south.

The time of high water is about the same as at the entrance of the Gironde, but rises about a foot less than at Cordouan Tower; but the time of high water is an hour later in the road in the interior of Arcachon Basin, in Notre Dame Chapel, than on the bar.

The bar of Arcachon shifts, and increases to the southward, and that so frequently, that no chart of it can be depended on for any length of time. Two beacons, one of which is moveable, are erected, to lead up the channel. The only anchorage in Arcachon Basin, where large ships can anchor with safety, is between Bernet Point and the Channel du Teich; but this anchorage is difficult of access, as it is separated from Mouillo Road by a bank of fine sand, which shifts daily.

It is not the shallowness of the water which renders the entrance to this basin dangerous to ships of all sizes, but the heavy sea which frequently breaks on the bar, rendering it on many occasions quite impossible to go over. The fishermen *often prefer keeping at sea for days, in rough weather, than*

risk the bar, and are frequently obliged to run for Rochefort, or the Gironde.

On Cape Ferret, the northern side of the basin, at 3281 yards from the entrance, is a lighthouse which exhibits a fixed light at 167 feet above the sea, visible about 18 miles in clear weather.

A bank named the Bank of Arcachon, and upon which there are stated to be 16 to 18 fathoms, and even less water, appears on a chart of the "Neptune Oriental," of M. d'Apres de Manneville, published in 1775, and from it has been copied into all the charts of the Bay of Biscay since published, but it is not known upon what authority it was originally inserted. It was sought for without success by the French surveyors; and the fishermen of La Teste, who are reputed to be very intelligent, and who sometimes proceed to this distance from land, are unacquainted with it. Its existence is therefore very questionable, and has led us to expunge it from our chart.

From the Basin d'Arcachon to Bayonne, the distance is about 22 leagues, the land between being low and level, excepting some little downs, covered with trees, which appear to be elevated above the general level. Along the coast there are numerous guard-houses. There is deep water all the way pretty close to the shore; but about 8 miles from Bayonne, there occurs a singular break in the soundings, with very deep water from the sea nearly up to the beach. This is named the Fosse of Cape Breton, and its general direction is indicated by two beacons erected on the shore side.

FOSSE OF CAPE BRETON.—The depth in the Fosse, at about $1\frac{1}{2}$ mile westward of the shore, is from 50 to 55 fathoms; at 4 miles, 85 fathoms; at 5 miles, 120 fathoms; at $6\frac{1}{2}$ miles, 174 fathoms; and in continuing to follow to the westward in the same direction, there is found a bottom of soft mud, upon which the soundings are less than in the Fosse itself. At 20 miles from the coast the depth of 180 fathoms is lost, a line of that length not reaching the bottom.

On each side of the Fosse the depth is from 10 to 45 fathoms, on a sandy bottom; and in blowing weather a heavy sea breaks over the sandy flat on the north side.

The surveyors have remarked that "Cape Breton Deep has been very carefully examined; and we are convinced, that if the eastern extreme of this extraordinary deep has not an anchorage as safe as seamen generally believe, it has at least an anchorage less dangerous than any other part of the coast in the environs of Bayonne.

It will be in vain for a vessel wind-bound and retained near the bar of the Adour, with heavy on-shore winds, to attempt to gain the Deep of Cape Breton, by keeping at a short distance from the coast, as she cannot fail being overwhelmed by the heavy sea which will be found upon the bank which limits this deep from the coast to the south. To gain the deep, in rough weather, you must be about 6 miles from the two beacons, and continue to run between the breakers on the north and south sides. It has been stated that the bottom of the deep offers good anchorage; and also, which is more to be relied on, that in no part is good anchorage to be found. In rough weather it will be often less dangerous to run for an anchoring-place on the mud and sand bank outside Adour bar, than to seek for Cape Breton Deep by keeping near the shore, or reaching out to sea."

BAYONNE—The bar at this place frequently changes; the sea without is very rough, and there is no entrance but at high water, and then a pilot is indispensable. The following instructions were published in 1839 by the officers of the port:—

"Captains of vessels bound to Bayonne should carefully calculate the time of *high water*, in order to be off the bar at the proper time for entering the

Adour. Their calculation should be founded on the establishment of the bar, which is at 3h.30m.

When the sea is smooth, the bar will allow the passage over it at spings, of vessels drawing 14 feet, and at neaps those of 11 feet may pass over it, provided in both cases, that they do so at the time of high water. It is not always the deficiency of water on the bar of the Adour which determines the chief of the pilot station to signalize that the entrance of the river is impracticable, or at least dangerous; he is guided in his decision as much by the state of the sea on the bar, and the velocity and duration of the ebb stream. The sea is sometimes smooth outside, while it is terrific on the bar, and then it would be impossible to steer a vessel in the surf on it, while even the wind may be fair for entering.

Th pilots may be sometimes deceived in their opinion respecting the state of the bar of the Adour, but whatever state it may be in, when there is nothing to prevent a vessel keeping the sea, there is no excuse for a vessel attempting to enter the river, when their experience decides on the signal being made not to do so. Even success in the attempt is scarcely enough to justify it. Captains are moreover informed, that the final signal to any class of vessels not to attempt the bar is never made, but after the result of a mature deliberation among the pilots along with their chief.

Great care should be taken when making the bar, to keep to the northward of it, whenever the wind has previously prevailed from N.N.W. to East, and to keep to the southward of it on the contrary, when the wind has prevailed for 5 or 6 days from South to W.N.W.

Entering with Wind from N.N.W. to East.—Experience has proved that in the first of these cases, the current sets to the S.W., and that it has carried vessels down to the coast of Spain that have not taken the above precaution.

Entering with the Wind from South to W.N.W.—In the case of the wind being from the South to W.N.W., the current sets to the N.E.: vessels are then exposed to being drifted to the northward of the bar, when finding no shelter, and being unable to keep off the land in bad weather, they are obliged to run on shore between Bayonne and Vieux Boucant.

Entering with the Wind from N.N.W.—*Approach to the coast by the light of Biarritz.*—When the wind is from N.N.W. to N.W. a vessel may run directly for the mouth of the river, and in this case, as in the preceding, it should always be remembered that the light of Biarritz is a short league to the S.W. of the bar.

When a ship bound to Bayonne meets with the wind between W.S.W. and W.N.W. on the coast of Spain, and at such a distance as precludes the hope of entering the river before dark, she should stand off and on under a press of sail, so as to counteract the effects of the currents, which run at the rate of four or five knots to the N.E. whenever the wind has been blowing some days between W.N.W. and South; she ought also to strive to keep an anchorage under her lee, into which she may run in the morning, in case of the weather obliging her to seek refuge in it. If she be certain that the current is setting her to the N.E., as we have said, she should stand two hours to the northward, or to sea, and three hours to the southward, or in shore. The practice of the most experienced navigators has confirmed the importance of this mode of proceeding.

SIGNALS.—Signals are made for ships to enter or keep off, thus:—

Signals for Entering.—In the signals for entering, it is essentially necessary to distinguish that signifying approach from that of entering. They are made from two different stations, but with the same system of flags.

1. *Signal of approach.*—The signal of approach summons vessels to the bar.

2. *The Signal of entering.*—The signal of entering summons vessels across the bar, and directs them how to steer, so as to pass it.

Places from which the Signals are made.—The signal of approach is made on the shore to the south of the entrance, on a mast 100 feet above the level of the sea at high water. That for entering is made at a white tower about 50 feet high, at the head of the southern quay, about 5 or 6 cables' length from the bar. The mast for the signal of approach is about $1\frac{1}{4}$ cable's length from this tower.

Ships coming to Bayonne should arrive at that distance which will enable them to distinguish the mast for the signal of approach, in order that they may conform to the signals from it, or keeping off as hereafter stated.

COLOUR AND SIGNIFICATION OF THE FLAGS.—Flags shown at the Tower. 1.—Swedish flag (blue with a yellow cross) signifies that vessels under 9 feet draught are to approach. 2.—Flag chequered with red and white squares—that vessels drawing 9 feet and more are to approach. 3.—Dutch flag (tricoloured horizontally) that vessels of all kinds are to approach.

Vessels are distinguished by two divisions, to each of which a particular flag is assigned. Their coalition is indicated by the Dutch flag, which is addressed to all, large and small.

Ships to approach.—The division of vessels, the signal of which is made to approach, should make all possible sail to profit by the tide in entering. When about a quarter of a league from the bar, these vessels should observe whether their signal is made from the tower, and then they will obey successively the indication of the flag from this tower, as will be seen in the special article on passing this bar.

Ships to keep off.—If, after the signal has been made for ships to approach the bar, the chief pilot considers it necessary, in consequence of a change of weather, to make the signal for keeping off, he will hoist and lower the Dutch flag on the tower 3 times, after having hauled it down from the flag-staff, for calling the vessels in, there will then be no signal up anywhere.

When the chief pilot forbids one class of vessels only from entering, he will hoist and lower 3 times the flag addressed to this class, and re-hoist on the flag-staff on the sand-hill the Dutch flag for that class of vessels which he would have approach the bar.

Order not to approach so near the Coast.—If the vessels summoned to the bar approach too near the coast, and the time for entering the river be not come, the signal to them will be hauled down; but as the signal for keeping off is not made at the tower, this is no denial for their entering. Vessels waiting for the time should keep a little to seaward under easy sail, until they are finally called to enter.

EXAMPLES IN THE USE OF THE FLAGS IN DIFFERENT CASES.—1. The chief pilot considers that none but small vessels will be able to enter in the course of the tide. In this case the Swedish flag is hoisted on the flag-staff on the beach. Small vessels may crowd on sail for the bar, where they will wait until the same flag hoisted at the tower directs them to the entrance.

2. The chief pilot considers that the state of the sea will permit only large vessels to enter. In this case the chequered flag will be hoisted at the flag-staff on the beach; large vessels only will approach the bar, and the same flag hoisted at the tower will direct them to the entrance of the Adour.

3. Ships of both classes may enter Bayonne, as is most generally the case. The Dutch flag, on the flag-staff on the beach there, calls all vessels over the bar. The chief pilot commences taking in the small ones at half-tide, hoisting the Swedish flag at the tower. When there is sufficient water on the bar

for the large ones, the Swedish flag is hauled down, and the Dutch one shown in its stead, which applies equally to vessels of both classes.

4. The Dutch flag having called all vessels without distinction, the chief pilot may consider it right, from motives of which he is the best judge, to warn off the large vessels, and only to admit the small ones; in this case the Dutch flag at the flag-staff on the beach is lowered, and the Swedish flag substituted for it; at the same time the chequered flag is hoisted and lowered three times at the tower, to warn off large ships. Small vessels only should remain then, and wait till the Swedish flag is hoisted to direct them over the bar.

5. The whole of the ships having been directed to enter by the Dutch flag, the sea may increase so that it becomes necessary to forbid small vessels entering, in order to admit the larger ones. The signals will be the same as in the fourth example, that is, the chequered flag is substituted at the flag-staff on the beach for the Dutch flag—at the same time the Swedish flag will be hoisted and lowered three times at the tower flag-staff, to warn off the small vessels. Large ships should look out and remain till the chequered flag is also hoisted at the tower, to direct them over the bar.

PASSAGE OVER THE BAR.—As soon as one of the three flags is hoisted at the tower, the ships which it summons should make all sail possible for the bar, taking care to leave room between each other, so that no one should enter the surf until the one preceding her has passed it, and has had time to pass the signal-staff and anchor.

As soon as the first ship has arrived within the surf, the flag at the tower will be lowered half-mast high, and hoisted again immediately; this movement will indicate, that it will be to her that the signals from the tower will be next addressed; when the second ship has also passed the bar, the flag at the tower will be lowered and re-hoisted again to make signals to the third, and so on. It is recommended that captains of vessels pay the greatest attention to this signal, in order that they may not fall into serious mistakes.

Whenever the flag of the tower is inclined to the north or to the south, the vessel entering is to put her head more to the north or south than before, and will continue to do so as long as the flag is so inclined. As soon as the flag is righted, the vessel is to keep on the course on which she may be at that instant, and will continue so until she be signalled afresh by the same flag.*

If two vessels, one from the north and the other from the south, should offer at the same time to take the bar, as the signals to be made to them must necessarily be contrary, no signal will be made to either, in order that all fatal mistakes may be avoided. The flag of the tower will then be lowered, the two ships must haul their wind, and the signal will be re-hoisted when they are at the entrance of the port, or at least when they are so situated as that all confusion will be avoided.

When a vessel's draught of water is required to be known, approaching the bar alone or before others, the flag of the tower will be hoisted and lowered once. If the vessel draw nine feet and under, she will answer by hoisting

* **EXAMPLE 1.** Suppose that a vessel is to the N.W. of the bar, steering S.E. to enter.—

If the flag of the tower be inclined to the southward, this vessel should come successively to the South, S.S.W., and even S.W.; in fact she should keep more and more to starboard, as long as the flag remains inclined to south. As soon as the flag is righted, the vessel will keep on the course she was steering at the instant; should she be steering S.S.W. she should keep so till signalled afresh.

2. When a vessel to the S.W. of the bar is steering N.E.—

If the flag on the tower be inclined to the north, the vessel will keep more to port as long as the flag remains so inclined, and she will, as above, keep her head on the course she may be steering when the flag is righted. Other signals from the tower will be directed to her.

and lowering her flag once ; if she draw ten, by doing so twice ; if eleven, three times, and so on.

After the above answer, or under any other circumstances, if the chief pilot considers it necessary to delay a ship's passing the bar, that may be making for it, he will hoist and lower twice the flag of the tower ; and if he denies her taking it altogether, he will hoist and lower it three times. No signal appearing at the signal-staff on the beach, it will be evident that this signal of denial will only apply to the vessel about or nearest to enter, for we have seen above that it is necessary to change or suppress the signal of approach, that the signal of denial made at the tower may apply to the whole divisions.

The bar being connected with the points forming the mouth of the river, and lying distinctly out to seaward, ships should carefully avoid keeping along the coast when near it. The mouth of the river should always be kept well open, without approaching the surf more than is actually necessary in crossing it.

The River of Bayonne is subject to freshes, or a considerable increase of water, which retards the flood tide, and prevents its entrance. The current under these circumstances always runs out, as may be found by the river water being met a league and even more outside. A vessel should not then attempt to enter the river, because this current will increase the difficulty of passing the bar ; nevertheless, if the wind be fresh, and the entrance be not interdicted by the flag-staff on the beach, it may be attempted ; but it will be necessary to make all possible sail to run over the surf on the bar, which is very dangerous ; under such circumstances it is necessary to be ready to enter at least an hour and a half before high water.

Generally, in bad weather, when the sea is high on the coast, it will be necessary to take the bar with all the sail a vessel can carry ; the head sails should be hoisted, and the sheets hauled flat aft. If entering before the wind, this precaution is indispensable, for if a sea broaches the vessel to, either way, it is necessary, in such a narrow passage, to have the immediate assistance of the head sails to regain the course.

In bad weather, vessels which cannot pass the bar of Bayonne, if the weather permits, should anchor in the excellent Port of Passage, in Spain, where they will be certain of finding pilots and every necessary ; when captains require it, the chief pilot of the bar can send to Passage for pilots and instructions to take ships into Bayonne. With this precaution there is never any risk in returning to the anchorage after having left it.

To the northward of the Bay of Bayonne there is not anchorage for a vessel in bad weather, not even in the Fosse of Cape Breton. The beach of this fosse, nevertheless in case of loss, is one on which vessels may run for a chance of saving their crews ; unfortunately to gain this in bad weather, it is absolutely necessary to run into the fosse at its entrance, about six miles from the coast, and indicated by two buoys, and then steer up to the shore. To the northward or southward of the fosse are two long flats of sand, on which the sea breaks furiously, and which it is scarcely possible to pass.

CAPBRETON.—There is but one anchorage to the north of the bar, near the fort of the village of Capbreton, which is in 30 fathoms, muddy bottom ; but this anchorage is very dangerous when the wind blows on the shore.

LA SABLIERE.—The coast offers several places of anchorage in moderate weather to the south of the bar ; the first is named La Sabliere. Here the anchorage is at a mile from the shore, in 12 or 13 fathoms, fine sand or mud, with the village of Biarritz bearing E.S.E.

SOCOIA.—If there be not too much sea, vessels which cannot get into the *Adour* may anchor at Socoa, a little port very safe, inside the west point of

St. Jean de Luz, but they should consider first their draught of water, the tides and directions, and, above all, should keep clear of detached stones proceeding from the rubbish of the quays of St. Jean de Luz and Socoa. Vessels anchor here in 4 fathoms at low water, the bottom sand and rocks, and it is necessary to buoy the cables. The jetties of the port afford shelter from the wind, but the anchorage is very dangerous in northerly and N.E. winds.

FUENTERABIA.—There is also clear anchorage near Fuenterrabia, in Spain, in 5 to 10 fathoms water, on a soft and muddy bottom, with good shelter from westerly winds; but from N.W. and northerly winds this place affords no protection whatever. Navigators are especially reminded, that, as soon as they get a glimpse of the shore, if they wish for a pilot, they must be careful to hoist a flag at their fore topgallant-mast head, by which they will be certain of obtaining one, according to their position, either from the port of Socoa, or from the villages of Biarritz, Guethary, to the southward of the Aar, or even from Bayonne and Capbreton, if the sea be smooth.

Small vessels are safe here in anchoring close to the Chateau du Figuier, bearing south by compass; it is there that the fisherman of St. Jean de Luz wait, made fast to the shore, until they can return home. Large vessels anchor at two or three cables' length south of the fort, in 8 or 10 fathoms, muddy bottom, where they are safe from winds from S.S.W. to W.N.W., but in danger with northerly ones.

It is strongly recommended to captains bound to Bayonne, particularly in winter, and with westerly winds, to make the land on the coast of Spain, between Cape Machichaco and San Sebastian: that in case the weather should become tempestuous, and crossing the bar of Bayonne dangerous, they may have to leeward of them, either the Ports of San Sebastian and Passage, in Spain, or St. Jean de Luz and Socoa, in France, from which ports they will be sure of obtaining pilots.

At $3\frac{1}{4}$ miles, S.W., from the mouth of the Adour, is the little Port and village of Biarritz; the village is nearly a mile from the sea. On Point St. Martin de Biarritz, at the distance of $2\frac{1}{4}$ miles, S. 33° W., from the mouth of the Adour, is a light tower, from which a revolving light is exhibited. The flashes from this new light succeed each other every half minute throughout the night; and in clear weather, they will be visible to an observer, elevated 33 feet above the surface of the sea, at the distance of 8 leagues, and they will not be entirely obscured when within a distance of less than 4 leagues.

The Village of Bidart, with a small rivulet, lies $7\frac{1}{4}$ miles to the S.W. from the mouth of the Adour. Between this place and the entrance of Socoa, or St. Jean de Luz, the shore consists in general of low rocks, with a few patches of sandy beach, but the inland country is very high.

SOCOA OR ST. JEAN DE LUZ.—Point St. Barbe, the east point of this harbour, is steep towards the sea, with a battery on it. The west point named Socoa Point, has a round tower, with a fortification under it, from which a pier extends S.E., a cable's length; within the latter, another pier extends to the East from the shore, so that the two form a little harbour on the west side of the bay, the entrance to which has but 3 feet in it at low water.

In order to accommodate vessels in this harbour, four transporting buoys have been laid down, in different situations, in which they may be attached, under the regulations of the port.

Signals are made to, and for the use of vessels in the vicinity. A fire on the mountain shows that a ship is in sight, seeking to gain an offing and avoid the port. The display of a red flag shows that she cannot enter before half-tide; but a white flag, substituted for the preceding, signifies that she may enter, and is to be directed by its movements, so as to gain the port; for the

ship's head must be directed to the side in which the flag may be inclined, and she must tack accordingly.

When there is seen on the summit of the mountain, another white flag, distinguishing the point of the North Kay, the commander must be very attentive to the last, it having the same signification as the preceding, to direct the road and to anchor; and when, lastly, so soon as this flag shall be struck, let go one of the anchors, and immediately after a second anchor, with a good warp. This done, furl the sails quickly, so as to present as little surface as possible to the wind; when, with steady management, the pilots will board and take charge of the ship.

The lighthouse on Socoa Point, exhibits a fixed light, elevated 115 feet above the level of the sea, and may be seen 10 miles off.

In the middle of the bottom of the bay, is the small River of St. Jean de Luz, having a depth of only 4 feet at low water. The river, at a little way up, divides into two branches, on the banks of which are the Towns of St. Jean de Luz and Cibouron, which are connected by a wooden bridge.

The entrance to this port may be found by means of two mountains, De la Rune and Batallera, the first bearing from Socoa Point nearly S. by E., 5 miles, and the latter S.W. $\frac{1}{4}$ W., $5\frac{1}{2}$ miles. Mount de la Rune is lofty and sharp-pointed, and it has, or had, a hermitage on its summit; yet when this mount bears S.S.E. to S.S.W. it does not so appear, but presents a level ridge from the hermitage to the S.E., which seems to be still longer when it bears to the westward of S.S.W. Many ridges appear beyond this mountain, all of which are much farther up the country. Mount Batallera is high and broad, and, when viewed in the direction above mentioned, appears like a crown, set round with a number of small peaks on its summit. Hence the French commonly call it La Montagne Couronnée, or the Crowned Mountain. When it is seen to the westward of S.S.W. (true south), it loses the figure of a crown, and presents only three irregular peaks.

COURSE TO RUN IN ON.—Extracted from the *Nautical Magazine*, 1839:—

"The Bay of St. Jean de Luz is about 6 cables' length deep, and nearly as many wide, from the Point of St. Barbe to the Fort of Socoa. Nearly in the middle of this line is the Arta, a bed of rocks on which the sea often breaks, although there are 4 fathoms on it at low water. This bank is on the line from the Steeple of St. Jean de Luz to Mount Eshawrre, and from the tower of the Fort of Socoa to the house nearest it. There is a passage between this danger and the Fort of Socoa, about one-third the breadth of the bay at Socoa; the rocks are thus left to port on entering. It is necessary to avoid as much as possible entering before the time of half-flood, although the pilot boats can go out at a quarter-flood, and even at low water of neap tides. The time of high water is the same as at the bar of Bayonne.

In neap tides there is not more than $1\frac{1}{2}$ foot water in the Harbour of Socoa. With smooth water a vessel, drawing $8\frac{1}{2}$ feet, can enter at high water, and if the tide be high and a strong breeze from W. or N.W., vessels may enter drawing $9\frac{1}{2}$ feet water.

In spring tides, the port dries as far out as the north jetty. With smooth water a vessel drawing $11\frac{1}{2}$ feet water may enter, and with W. and N.W. winds, and a high tide, a vessel drawing $12\frac{1}{2}$ feet may enter at high water.

Marks for laying the Northern Anchor, bearings by compass.—Church of St. Jean de Luz S.E. $\frac{1}{4}$ S.; Chapel of Bordagain S.S.W. $\frac{1}{4}$ S.; and the capstan on the north quay of Socoa N.W. $\frac{1}{4}$ W. *The S.W. Anchor*.—Church of St. Jean de Luz S.E. 2° E.; Chapel of Bordagain S.S.W. $\frac{1}{4}$ S.; and the same capstan N.N.W. $\frac{1}{4}$ W."

THE NORTHERN COAST OF SPAIN.

FUENTARABIA.—Cape Higuera, the western side of this harbour, lies 3 miles to the westward of Socoa Point. At a short distance E.N.E. from the cape is a rocky islet, which leaves a passage fit only for coasters. The eastern point of the harbour is named Arretas, and close to it, on its western side, are two round rocks like towers, with smaller rocks on the N.N.W. and N.N.E., from which a reef extends half a mile to the northward, a part of which is uncovered at low water.

Point Turrula lies 3 miles to the westward of Cape Higuera. It extends but a little way out from the foot of Mount Jaysquivel. Here the coast is of rock, and many points stand detached from the land. Hence to Port Passage the shore is high and steep.

PORT PASSAGE is formed by high steep shores, from each of which, at the mouth, two low rocky points run out in opposite directions, thus straitening the entrance. The point on the east side is named the Great Arando, and that on the west side the Little Arando, and both consist of the extremities of two rocks above water, the one larger than the other.

These points bear from each other nearly W. by N. and E. by S., distant 92 fathoms, being the whole breadth of the entrance of the harbour. They are very clear, without any hidden danger, excepting just at high water, when a small part of each is covered. At one boat's length from them are 7 fathoms water.

A little outside the harbour are two rocky patches, one lying on either side of the entrance. That on the east side is named the East Bank, and lies at the distance of 50 fathoms from the shore, and about twice that distance from the Point of the Great Arando. This shoal extends 41 fathoms along the shore, and has on it but 6 feet water, although between it and the land the depth varies from 4 to 7 fathoms, and close to its northern side are 11 and 12 fathoms. To go clear of it keep about a cable's length from the shore.

The West Bank lies a little to the north of the Little Arando Point, and consists of a sharp-pointed rock with but $2\frac{1}{2}$ fathoms on it; but close to it the depth is 5 to 6 fathoms, and at a little distance all round are 8 to 10 fathoms, with a corresponding depth between it and the shore. The mark for this shoal is the Hermitage of St. Anne hidden by the spot on which the iron cross on the Point of Cruces stands, and the Pilon of La Banca (a rock on the land, about 2 cables' length from the shore, and N.E. from another resembling a ruined tower) in one with the westernmost part of La Plata, which is a precipice with a very smooth surface, on the north face of the hill, at the Point of the Little Arando. The sea breaks on these banks when there is any swell. This harbour is not so readily found by strangers coming along shore from the westward, as there is no opening to be seen in the land; but in coming from the eastward, it will be known by the Hill of Jaysquivel, which is the last hill of the Pyrenean Mountains on the sea, and the first high land along the shore. At the western slope of this mountain is the entrance to the harbour. But vessels from the westward will find the entrance by first making the Lighthouse of St. Sebastian and the Castle of La Mota, which, standing on high ground, are visible at a great distance.

Within the points which form the harbour, the shores are rugged and craggy; that on the east is bordered with rocks, which, in some places, extend 15 fathoms from the land. On the opposite side the Point of Cruces projects, at low water, about 6 fathoms from a high and very steep hill, forming at the bottom a *small level spot*, on which people may land, but entirely

covered at high water. It is named Cruces from an iron cross fixed on the side of the hill, about one-fourth the distance up from the point to the summit.

The Castle of Sta. Isabel, or St. Elizabeth, on the eastern side, is the first building seen within the harbour. The Tower of St. Sebastian, above it, on the opposite side, is round and high; it seems standing in the water, but is connected to a small battery on the land. The space between the Castle of St. Elizabeth and this tower is the only anchorage for vessels drawing more than 10 feet water.

The Hermitage of St. Anna is the second building seen on entering the harbour. It stands on the eastern side, at a quarter of a mile above the Castle of St. Elizabeth, and serves as a mark for avoiding the western shoal that lies without the entrance.

In entering the harbour, when at the distance of 2 or 3 cables' length from the mouth of it, bring the Hermitage of St. Anna, with the rocks at its base, open with the iron cross on Point Cruces; or bring the extremity of Point Cruces in a line with salient angle on the western side of St. Elizabeth's Castle; then stand on, with these marks, in mid-channel, until you are half-way between the little Point of Arando and Point Cruces. From this spot stand more to the eastward, in order to keep clear of the rocky shoal about that point, until the Tower of St. Sebastian appears between St. Elizabeth's Castle and the point. Now steer for the tower, which will lead through the deepest water to Point Cruces, whence you turn towards the Castle of St. Elizabeth. Having passed the Castle of St. Elizabeth, you may bring-to, in $3\frac{1}{2}$ or 4 fathoms, with an anchor from the stern; then make fast cables to the shore on both sides, in rocks bored through for the purpose. At high water there will be room to turn the vessel round, and to moor with 4 good cables out, N.E. and S.W., and N.W. and S.E., especially in winter, on account of the strong run of the sea and the whirling gusts of wind, which come down through the breaks in the hills into and about the harbour.

The time of high water in the port is 3h. Common spring tides rise 12 feet, neap tides 8 to 10 feet; equinoctial spring tides, 15 feet.

General Remarks.—1. A large vessel may take this harbour with the wind from W.N.W. by the north to E.N.E., when the tide is growing, and the sea not very rough. Other winds are apt to take the vessel a-head, in the windings in the harbour, which is too narrow to admit of tacking; but when these winds are very easy, vessels can anchor at the entrance, and may be warped in, or towed by the country boats. The most adverse wind is from the West; for as, from the mouth as far as Point Cruces, it draws away a little to the N.W., it promises an easy entrance; but, from this point inwards, it comes away from the S.W. squally and uneven, so as neither to allow a vessel to go in, nor to turn back to the mouth, nor even to come to anchor, because this is the narrowest part of the harbour, so that such circumstances render an advance dangerous.

2. The tide ought to be growing, for the wind commonly dies away between Point Cruces and St. Elizabeth's Castle; but the tide, added to the ship's way, soon carries her beyond that spot; but with regard to the steerage, it is taken for granted that she has boats, both a-head and a-stern, to assist in case of danger. Should she touch the ground anywhere, the tide probably may lift her off.

3 If the sea without be not moderate, the water is so rough within the harbour as to disturb the steering of any vessel, and she may in a few seconds be on shore.

4. *At this and the other harbours hereabout the activity of the native sea-*

men alleviates the dangers very considerably, being ready with their boats in piloting and towing vessels into them. Those of Port Passage and the neighbouring harbour of St. Sebastian have peculiar encouragement, by a regulation, which ordains that the boat which first reaches the vessel must be employed, and each man in her paid 12 reals of Vellon, or 2s 6d sterling. The other boats may either be employed or not, at the option of the master, and each man employed can demand only 9 reals, or 1s 10d $\frac{1}{4}$. Both men and boats are well qualified for towing, warping, mooring, or keeping a vessel of any size in her proper course.

5. In thick or hazy weather, when the people in the vigias, or look-outs, on land, are unable to discover vessels, on firing a few shots, the boats stand off to sea, but not beyond soundings. In stormy weather, when they cannot venture off, the people repair to the mouth of the harbour, to make fast cables on shore, and do everything else in their power to assist vessels approaching.

At the distance of 5 leagues from Port Passage, the depth without varies from 100 to 120 fathoms; and at one league, from 25 to 30 fathoms; in some places rock and in others sand. The prevailing winds hereabout are, in winter, from the S.W. and N.W. quarters, in general with rain. In summer, gales from E. and N.E., with clear open weather, are frequent. The currents generally follow the direction of the winds.

If a vessel bound for Port Passage should find the wind blowing hard from west, the safest way will be not to attempt this harbour, but to run, if possible, into that of St. Sebastian, and stay there until the wind or weather changes; or, if more to the westward, she may be sheltered on the east side of the Atalaya, or Look-out Point, of Guetaria, 7 $\frac{1}{4}$ miles from St. Sebastian, as the anchorage there is safe and easily taken.

ST. SEBASTIAN.—To the westward of Port Passage is the high and steep Point of Atalaya, with a shoal at 2 cables' length from it, on which the sea breaks, when there is even but little swell. There is a passage between the shoal and the land, through which a vessel may venture in case of necessity.

The northern point of Mount Orgullo, or the high land of St. Sebastian, is a mile and a half from Point Atalaya; it is of moderate elevation, and has on its summit the large Castle of La Mota. Within the hill, on the S.E., is the fortified Town of St. Sebastian, which is the capital of the Province of Guipuzcoa, and the seat of its commerce.

The lighthouse on Mount Orgullo shows a fixed white light at 203 feet above the sea, visible 15 miles. It is lighted only during the winter months, or from the 14th of September to the 3rd of May.

In the middle of the bay is the small Island of Sta. Clara, upon which is a chapel dedicated to this saint. The island is of moderate height, although much lower than the hills on either side the bay, and is somewhat rugged. The passage between it and Mount Igueldo on the west, is almost closed up by several ledges of rocks, leaving only one narrow channel for small craft; but that between the island and Mount Orgullo on the east side, is clean, and has a depth in the middle of from 9 to 10 fathoms, but only 2 fathoms near the sides.

Without the harbour, at the distance of about a quarter of a mile from the Island of Sta. Clara, is a rocky shoal, named La Banca, which is about the same size as the island, and runs parallel to it. The soundings on it are from 3 to 6 $\frac{1}{4}$ fathoms, with 7 to 11 fathoms all round, and the sea breaks on it when there is a swell.

To enter the bay, keeping clear of La Banca, bring St. Bartholomew's Church (which stands in the bottom of the bay, on a rising ground near the

shore, and is the largest building in that quarter) in a line with Mount Ordaburo (which stands inland, having two peaks on its summit), and bearing S. by E. $\frac{1}{4}$ E. By following this direction, until the town of Guetaria is hidden by the northernmost part of Mount Igueldo, you will be within the shoal, and may make for that anchorage in the bay which seems most convenient.

The common anchorage for large vessels is about a cable's length to the south-eastward of Sta. Clara Island, but it will admit only two at a time, in from $4\frac{1}{2}$ to 5 fathoms, mooring with 4 anchors N.E. and S.W., and N.W. and S.E., as, from the small extent of deep water, there is not room for them to swing round. All the cables and anchors should be good, because those to the N.E. and N.W. have to resist the heavy sea setting in when the wind is to N.W., and those to the S.E. and S.W. have to resist the efflux of water out of the bay. Cables may also be made fast to the rocks of the island, taking care to serve them well to the length of 30 fathoms, as the bottom is rocky close around the island. At a greater distance the ground is clear and good. Small vessels may come-to on the south side of the island, in $2\frac{1}{2}$ and 3 fathoms.

For the protection of vessels trading with the town, there are piers, within which vessels of 300 tons may enter at high water, but when the tide is out they lie dry on a hard bottom. In a gale from the N.W. it is very hazardous to run for the piers, for the vessel must come-to opposite the outer one, perfectly exposed, and at high water precisely, when some of the shore boats must be employed to convey a cable to the ship, by which the people on the pier heave her within the heads.

From Mount Igueldo to the River Orrio, an extent of 5 miles, the coast is high and precipitous, and from two small projecting points are some detached rocks, with ground which appears of a whitish colour, and hence the second point is named Tierra Blanca. The latter is at the foot of Mount Agudo, which serves as a mark for the coast. The mouth of the River Orrio lies between high land on each side, and on its bar is a depth of only one foot at low water; the river, therefore, is frequented by vessels no larger than fishing boats and small craft.

From Orrio westward the coast continues high and steep to Point Mairuari, a distance of about one mile. An islet of the same name lies off the point, which is of moderate height, and surrounded with reefs. Hence follows the sandy cove of Saraus, a mile in breadth, the west point of which, named Itegui, is high and steep.

About $7\frac{1}{2}$ miles to the westward, from the Lighthouse of St. Sebastian, is the Atalaya, or Look-out Point, of Guetaria. It is the north point of the Island of St. Antonio, which has a chapel on its top. The island is rather elevated, and joined to the main by a pier, so as to afford a safe harbour for small vessels: but those of a larger class may anchor securely on the east side of the pier in 8 to 10 fathoms, being well protected from all winds from the S.W. to N.N.W., but is entirely open to other winds. This road may be readily known, when near the land, by the island; but at a distance the island is not distinguishable from the main land. In a state of uncertainty, if the flat shore of Saraus be made, this will be a certain guide.

Ships bound to Port Passage, with the wind hard at West will do well to come-to in this road, as the anchorage is safe and easily taken. Its only disadvantage is, that should the wind come round to North, which, however, seldom blows on this coast, it is generally very strong, and vessels must then *do their best to get off shore* that circumstances will allow.

About a mile and one-third from the Atalaya of Guetaria, is the little River

Sumaya. At its mouth is a bar, which renders entering difficult. It is used only by fishing-boats, or small vessels that go to load with iron, brought from the interior. On the west point, which is high, broad, and steep, with rocks extending about a cable's length from its base, is a small house, used as a watch-tower.

At the distance of 4 miles from this look-out, is the eastern point of the River Deba, which is high and precipitous, with some rocks at its base, and a large hermitage at its summit, dedicated to St. Catherine. The coast throughout this extent is all high and steep, and the shore not very clean. At $1\frac{1}{4}$ mile to the eastward of this river, is the Point of Piedra Blanca, so named from the white gullies in it, which appear very conspicuously at the distance of 6 or 7 leagues, and point out the situation of the river.

The River Deba is large, with a depth of 5 to 6 fathoms, excepting at the mouth, where there is a shallow and dangerous bar, but it is visited, during the summer, by some small vessels, for timber and wool. From hence the coast continues high and steep to the little harbour of Montrica, which has two piers. The points of the cove are closely surrounded with rocks, near to which is a depth of 7 fathoms. Two miles to the westward of Montrico is the River Ondarrua, a place of no consequence but to small fishing-vessels.

St. Nicolas' Island, at $3\frac{1}{4}$ miles from the River Ondarrua, is joined to the main land by a neck of sand, uncovered at low water. It is an islet of middling height, with a hermitage and battery on it. Within it is the little haven of Lequeitio, which admits fishing and other small vessels. A little more than a mile from this is the Hermitage of St. Catherine, with a watch-tower on a projecting point of moderate elevation, perpendicular towards the sea, and of a black colour, the singularity of which marks this part of the coast, as well as the Height of Lequeitio, which stands at the distance of a mile from the Hermitage. This height or hill is lofty and irregular, and its summit is crowned with a small flat peak.

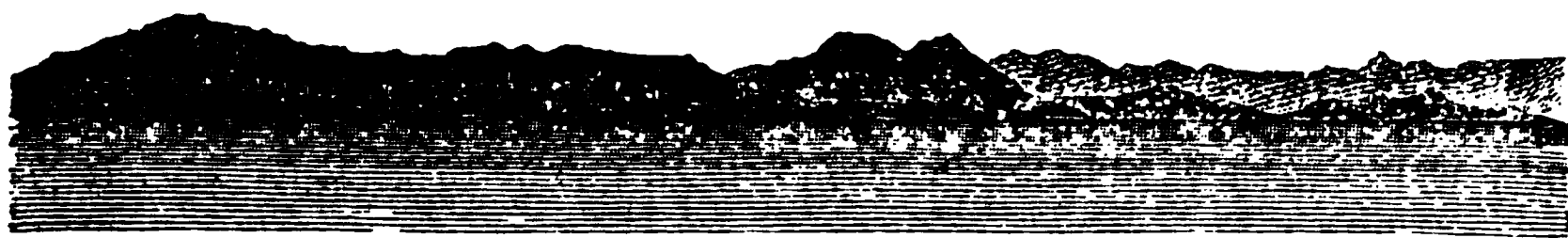
At rather more than a mile from St. Catherine's Point is the Point of Hea, which is low and rocky, with some large rocks about it, but a little farther on, the shore rises to a considerable height, forming a bay rocky all over. Cape Ogouno, which is high, of a red colour, and perpendicular over the sea, is $5\frac{1}{4}$ miles from the same point. This cape is an excellent land mark, there being no other like it on the coast. The Isle of Isaro, surrounded with shoals and rocks, lies 2 miles from Cape Ogouno, and there is a passage between it and the main, of 12 fathoms. Within this island is the mouth of the River Mondaca, impeded by a shallow bar, but inside it is deep.

The Harbour of Bermeo, a small creek, lies $1\frac{1}{4}$ mile from Isaro. Its entrance is only a cable's length in breadth, and is open to the E.N.E. On the N.W. side is the town, with a pier, for fishing and coasting-vessels, of which many belong to it, but the greatest part of the harbour is dry at low water. The way in is by the S.E. point, as on the N.W. side are several shoals.

At three-quarters of a mile from the town of Bermeo is Point Uguerray, which is steep over the sea, and has a battery upon it. In this space there are several rocks lying near the shore.

CAPE MACHICACO is $3\frac{1}{4}$ miles from the Island of Isaro. It is not very high but steep, and has a number of high rocks about its base. Within the point, the ground gradually rises at an inclination of about 20° above the horizon, forming at last a high, broad, and wooded hill. At about half way up the slope is a sudden break in the face of the hill, which is visible in

every direction between W.S.W. southward, to E.S.E. (by compass), and serves to distinguish the cape from other mountains in the neighbourhood.



A. Cape Machicaco bearing S. $89\frac{1}{2}$ deg. W. (true), distant 8 leagues.—B. Land nearest to Bilbao.

On Cape Machicaco there is a lighthouse, showing a light of a natural colour, at an elevation of 285 Castilian feet, visible from 18 to 20 miles in clear weather. It is represented to be of the first Catadioptric order of Fresnel's system, and flashes at intervals of four minutes.

At two-thirds of a mile to the west of Cape Machicaco is Aquech Islet, which is high, broad, and steep, but clear to seaward, and at $1\frac{1}{2}$ mile from the same cape, is another joined to the land by a bridge, and having a chapel on it. Behind this the land is high and rugged.

Between the Fosse of Cap Breton and Cape Machicaco, there are generally found, at 2 miles from the coast, soundings of soft mud, mixed with fine sand. This muddy bottom is limited towards the East by the edge of a great flat of irregular rocks, situated at the entrance of the Bay of St. Jean de Luz, and by the small flat of isolated rocks before the River of Bayonne, both of which were examined in 1826 by the surveying party acting under the orders of M. Beauteemps Beaupré.

The bottom, between Cape Machicaco and Cape Ortegal, offers nothing remarkable to favour an approach. The bottom is frequently lost in 180 fathoms, at a distance not much beyond 12 miles from the coast, but as you are then in sight of land, it is not of so much importance. Here you may determine the position of your ship, by taking bearings of the land, which, in ordinary weather, can be seen at the distance of 15 leagues. Upon the chart of the Bay of Biscay we have added some views of the principal headlands of the coast, which will doubtless prove valuable.

The Spanish pilots, and many fishermen, have reported, that upon several parts of the coast of Spain, after having lost soundings with a line of 180 and 230 fathoms, banks are met with of 70 and 90 fathoms; but the French surveyors were not able to verify the assertion.

Cape Ortegal, the northernmost point of the coast of Spain, has soundings round it to a considerable distance, as the bottom is not lost with a line of 180 fathoms, till you are about 25 miles from the land. The quality of the bottom in the neighbourhood of the cape, and hence to Cape Finisterre, is almost always of muddy sand, or sand and mud, the rocky bottom extending only 2 or 3 miles from the cape.

CAPE VILLANO lies about $6\frac{1}{2}$ miles from Cape Machicaco, and is high, broad, and precipitous. Between the two capes there is a bay surrounded with high grounds, and two small spots of beach, with two little fishing-villages, the first named Baquio and the second Armenta. There is also, about midway between the headlands, a sharp-pointed hill, named the Alto of Plensia, which is the most elevated ground in this tract, and serves to point out the situation of the two capes.

About half a mile westward from Cape Villano, is a small low islet close to the land: the point of land near the S.W. side of it is less elevated than the coast to the eastward, but equally steep and precipitous. Nearly a mile to

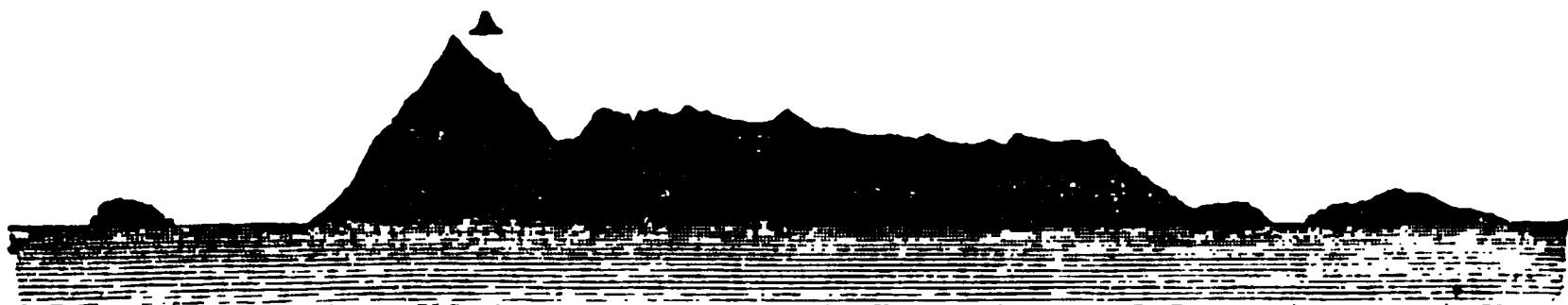
the southward from this point, is the entrance of the River of Plensia, open to the N.W., and formed by two high rugged points of a reddish colour, but impeded by a shallow bar, which frequently changes.

To this river belongs a considerable number of coasting-vessels, which are employed in transporting iron-ore for the different forges in the country, and timber for the Arsenal and Dock-yard at Ferrol. The town is on the northern bank of the river, at the distance of a mile from the entrance.

BILBAO.—At 5½ miles, W.S.W., from the island off Cape Villano, lies Point Galea, between which and Plensia the shore is moderately high and even, but steep over the sea: as this is of a whitish colour, it appears, at a distance, like a tract of sand-hills. A range of rocks appears along it.

On Point Galea there is a lighthouse showing a fixed light, at an elevation of 416 Castilian feet, visible 23 miles: it is situated 5200 feet from the extremity of the point.

The entrance to the Bay of Bilbao lies between Point Galea and Point Luzuero, its western boundary, distant from each other 3 miles, W. by N. and E. by S. When coming from the eastward, Bilbao may easily be known by the white appearance of Galea Point, and the wide opening of this bay, and these marks, together with the sharp-pointed hills of Luzuero, Serantes, and the south peak, will soon point it out to the mariner from the westward. The red point of St. Ignacio, lies half a mile within Galea Point: it has several rocks lying off it, one of which appears like a buoy when seen at low water, and is named the Pilot's Rock. Between this and the Point and Battery of Begona, farther on, is the town of Argota, having a small pier.



A. Serantes Mountain.

The entrance to the River Bilbao is formed by two piers, that run from the bar to the town. On the west side, at a quarter of a mile within the piers, is the town of Portugalete, off which is the best anchorage in the harbour; old guns are fixed in the ground on the quays, to which the cables may be fastened. On the outer bar, off Santurce, which is changeable, there is a depth of about 4 feet at low water. The chief and other pilots employed on the bar and river reside at Santurce. In winter a heavy sea sets into the bay, which at times renders it impossible for the pilots to go off.

If coming in when the tide does not serve for taking the bar, with an unfavourable wind, you may come to in the bay, midway between the outer points of Luzuero and Galea, bringing the latter in a line with Cape Villano, in 16 fathoms, with sandy bottom. There is here sufficient room, in case a heavy on-shore wind should bring home the anchor or part the cable, to let go a second anchor, before the ship can get ashore. In summer, you may lie nearer to the land, in from 10 or 12 fathoms, all the bottom being of sand.

The following Instructions for entering the port were given by Mr Henry Thompson, of H.M. ship "Saracen," in 1836:—

"It is high water on the bar at full and change at 3h. p.m., and at Bilbao at 3h. 20m. p.m. Spring tides rise 13 feet, and the variation of the compass, in July, 1836, was 23° W.

"Vessels bound to this river, in fine weather, will generally find pilots a

short distance from the land, as many of the fishermen living in the vicinity of the river are pilots.

"In standing toward the bar at the entrance of the river, the chief pilot will always be found in attendance, in a boat, which may be known from others by having a red flag flying, which boat is to be kept in a line with the western pier head, as the leading mark over the bar. The bar is sounded daily by this pilot (when the wind and weather will permit), otherwise it cannot be depended upon, in consequence of the sands of which it is composed frequently shifting. But, in bad weather, when boats cannot go out, on the appearance of any vessel standing into the bay, if the bar is considered passable, a red flag is hoisted on a point of land about half a mile outside Santurce, a small village on the western extremity of the bar; and, in this case, the chief pilot stations himself on the western pier head, with a red flag in his hand, with which he guides vessels across the bar, waving it to starboard or port, as necessary.*

"If the bar is not passable, a white flag is hoisted on the same point of land, and kept flying during the time any vessel is seen in the offing. In this case, I would recommend, during the winter months, any vessels to proceed to Santona, a port about 17 miles to the westward, and there await for moderate weather. The state of the bar is generally known by the pilots of that port, and the anchorage there is also good.

"During the summer months, I would recommend vessels to stand off and on, keeping outside the bay, and well to the westward, to avoid being driven on Cape Villano by the north-west swell, which is a common occurrence when the winds fail. Anchoring in the bay is not recommended under any circumstances, except for a few hours during the day, to await a tide, as the riding is very heavy; and should a vessel part her cables, it would be almost impossible to work out against the heavy north-west swell.

"It is impossible to lay down marks for taking vessels up and down the river, its navigation being very intricate, owing to the irregularity of the shoals.

"Between Portugalete and Olaveaga, there are several muddy flats, stretching out from the sides of the river, with only 8 feet at the deepest part at low water; and between Olaveaga and Bilbao, there are similar shoals extending the whole way across the river, which are barely covered at low water, spring tides. The river is navigable at high water, spring tides, for vessels drawing 9 feet water, as far as Bilbao; those drawing 12 feet to Olaveaga; those drawing 15 feet may lie at Saroza, San Nicolas, and Portugalete.

"The general mark for crossing the bar, for boats and small vessels (say, those drawing 8 feet), is to bring the churches of Portugalete and Cestaos in one, standing on with this mark until having arrived half-way between the point of land named El Campello (which is the one on which the red and white flags are hoisted to show the state of the bar) and the village of Santurce; the western pier at the entrance of the river will then be end on, which is the leading mark over the bar; and when abreast of the house named Casa de Campo Grande, which stands alone, about one-third of the distance from Santurce toward the pier head, haul over for the middle of the river, to avoid a ridge of loose stones, extending a little more than a cable's length from, and in a line with, the western pier head, with only 4 feet over it at low water. There is a similar ridge stretching out about two cables' length from the eastern pier head, dry at low water, which will also be avoided by following the above directions. Steer midway between the two piers until

On the flag being waved to starboard, it is meant that the vessel's head is to go to starboard, of course, the helm to port.

abreast of Portugalete, at which place there is good anchorage in the middle of the river, as far up as the bridge, named Las Siete Ojos, or the Seven Eyes, its having 7 arches.

“ After crossing the bar and being between the two piers, which form the entrance of the river (if boats have not been able to go out), a pilot will be found in readiness to go on board to bring the vessel to an anchor, or, if the wind and tide will permit, to proceed direct up the river. Should the wind prove otherwise, bullocks are provided by the pilots for the purpose of towing vessels up and down the river, there being a good stone pier on the left hand side, all the way to Bilbao.

“ The largest vessels the pilots will take over the bar, are those not drawing more than 15 feet water, but, in this case, it must be with a smooth sea on the bar, and a commanding breeze, at the top of high water, spring tides. The pilots generally dislike taking in such large vessels, as the bar is very dangerous, and cannot always be depended on.

“ I understand from the pilots, as well as from my own observations during two years in the river, that although the bar frequently shifts, in a short time it returns to the position as expressed in the chart, and averages that position 9 months in the year. A north-westerly gale has more effect in shifting its position, and often turns the channel in the shape of the letter S; at which time it is very dangerous, and has then generally less water on it. I have seen it at extraordinary spring tides left nearly dry, so that people walked across (there being at that time about one foot of water), but the above-mentioned marks will always take boats and small vessels across at high water.”

—*Nautical Magazine*, 1837, Page 46.

The town of Santurce is small, lying on the west side of the bay, and has a pier and harbour fit for small craft; from hence to Point Sevallo the distance is 3 miles, in a N.W. by N. direction, the mountain of Serantes lying between, and the land in general being high and rocky. About half a mile farther on, in the same direction, are the point and sharp topped hill of Luzuero.

To the S.W. of Point Luzuero are the Bay and Bar of Somorrostro, which is fit only for small vessels, and is used chiefly by those which take in the iron ore, obtained from the numerous mines in the neighbourhood. In going into this bay you must keep under the western shore, where are a battery and the chapel of Na Sra del Socorro. On the eastern side is an extensive low shore, visible 5 or 6 leagues off, which serves to distinguish the bay.

From Somorrostro the coast runs high and bold, a distance of about 2½ miles, to the village and small bay of Onton, which is so very full of rocks as not to be used even by the coasters. From Onton the coast runs high and steep 3 miles to the Island of St. Anne, near Castro Urdiales. In this space lies the town of Megono with its shallow bay, which is too shoal to admit anything but the small craft which load with iron-ore.

Castro is a bay of no great depth, formed by the Point of Catolino and St. Anne's Island. This island is connected to the main by a bridge, and has on it a hermitage visible at a considerable distance. The town of Castro extends from the point to which the island is joined, towards the S.W., and from the same point a pier runs southerly, which, with another beginning at the town, leaving only a small channel between them, forms a small shelter for coasters. At low water vessels lie dry, excepting towards the middle of the north pier and the entrance, where small craft remain afloat at low water of even spring tides.

Vessels may anchor in the Bay of Castro, S.E. from the pier, in 7 to 8 fathoms, sand and mud, with a cable made fast on St. Anne's Island. But this can be done only in fine weather, or when waiting for a tide, and in doing

it, they must give a good berth to the Point of St. Anne, off which rocks extend in an easterly direction to about one-third of a cable's length. In the town there is a good depôt of cables, anchors, &c., from which vessels may be supplied.

A short distance from St. Anne's Island is a small islet close to the shore; and at about two-thirds of a mile from St. Anne's Point, is the Point of Ravanal, which is very low, but steep over the water, and has a watch-tower on its summit, a little back from the shore. Between these two spots is a rocky bay of low land, with a number of large rocks in it, some above, others under water, running in about half a mile. On the N.W. side is a small place named Urdiales. This bay affords no shelter, besides that the greater part of the bottom is stone and rock.

At $1\frac{1}{4}$ mile from Point Ravanal, is a small island named Insua, which is almost constantly washed over by the sea. On the south side of the island is an headland of the same name, and between them is a passage of sufficient depth for small craft. Between these points the coast is rocky, low, and even.

From Insua Point the shore runs westward $1\frac{1}{4}$ mile to Point Islares, which is low and rocky, and has two large rocks close to it, being the south point of the Bay of Orinon. Between these two points the shore forms a low rocky bight of no use, with the places named Sandigo and Islares. At this point ends the tract named the Mountain of Serredo, which commences at Castro, but although it is high land, it is not much noticed at sea, being confounded with much higher mountains in the neighbourhood.

A little more than 3 miles from Point Ravanal, is Sonavia Point, which is in general even, but higher at the extremity than back from the sea, so that at a distance it looks like an island. This is the north point of the Bay of Orinon, which is $1\frac{1}{4}$ mile in depth, and has a river at the bottom. At the entrance is a sandy bar, and it is used only by small coasters which take in iron-ore.

From Point Sonavia rises up a high mountain named Candina, which is flat on the summit, and covered with a number of green spots. These, with the white rocks and cliff of which it consists, present an agreeable view in all directions, and afford an excellent mark for knowing the coast. From hence the shore runs bold with two small headlands, the land lowering down to the Point of Rastrillar, or the corner, as it is named, of Laredo, lying West, $3\frac{1}{4}$ miles, from Sonavia.

SANTONA.—This harbour is bounded by a high and steep hill with the coast on the south side. On the opposite side the Point Rastrillar appears high, broad, and uneven, and with a black colour, and has some large rocks under it, and shoals on the western and southern sides.

A bank, named the Doncel, lies at about one-third over from the Hill of Santona, which may be considered as the bar; it has 2 or 3 fathoms over it at low water. To the westward of this, at the mouth of the harbour, is a sand bank, named El Pitorra, extending westwardly to the length of $3\frac{1}{4}$ cables, and its central part is nearly dry at low water. Between this bank and the hill the channel into the harbour is only 2 cables' length in breadth, with a depth of $4\frac{1}{2}$ to 7 fathoms.

To sail into this port you should keep within a short distance of Point Frayle, which is a strange peaked eminence, supposed to resemble a friar, being the eastern part of Santona Hill, and take care to steer clear of Merana shoal, which lies N.E. by E., two cables' length, from the point. You may then run along shore, at the same distance, until Carlos Battery, on its south point, comes in one with the convent of St Francis de Ano; this is on the *west side of the harbour, at the foot, and on the south side of the hill of the*

same name, which is high and round like a haycock, and much covered with trees. This hill, from its situation and figure, can never be mistaken for any other; nor can the convent itself, as it is the only building to be seen in this quarter.

Keep this last mark on until you have passed the bar, or until you come near to the Carlos Battery; then haul to the S.W. towards the steeple of Cicero, by which the shallows of Carlos Battery will be avoided; but take care not to proceed too far to the S.W. lest you touch on the Pittoro. You will now see St. Martin's Battery, which is on the S.W. side of the Hill of Santona, then keep in mid-channel for the town of Santona, and anchor in 6 to 8 fathoms, sand and mud, mooring either E. or W. according to the set of the tides.

A vessel may anchor S.S.E. or S.W. by S. from Point Frayle, by bringing St. Carlos Castle in one with the Church of St. Francis de Ano; but in gales from the eastward of North, it is neither safe to run from here into the harbour, or weather Sonavia Point.

This harbour is much frequented by vessels when, owing to heavy north-westerly gales, they are prevented from attempting the Bar of Bilbao, which in these circumstances becomes very dangerous; also by vessels prevented by stress of weather from making Santander Harbour.

SANTONA TO SANTANDER.—About a mile from the north-westerly part of the Hill of Santona is the Point of Brusco, which is high and broad, but not projecting; and between these is a large beach, named the Arenal or Sand-hills of Berria, with low and marshy land to the southward, extending as far as the town of Santona. This low land gives the hill the appearance of an island, and conveys the impression that ships may run that way to the harbour.

From the Point of Brusco the coast continues of moderate height along the shore, but rises high in the interior. Nearly 4 miles from the Hill of Santona is the Point of Garfanta, which is low, and has some small rocky islands on its west side. On the east side of this point is a bay and beach covered with rocks, and a small town named Noxa, having a church visible at a considerable distance.

At 1½ mile from the Point of Garfanta is Cape Quejo, which is not very high, but rugged and of red colour. At a distance its summit appears to be level, but this illusion is dispersed when a nearer approach is made, as it then appears uneven. On it is a small house, which serves as a watch-tower. To the eastward of the cape is a bight, containing some small islands, and near to the cape is a rivulet, which dries at low water, and is only used by fishing-boats belonging to a place named Isla. The entrance of the river is not very easily distinguishable, as it is formed by two small rocky points running a very short way out.

A little more than 3 miles from Cape Quejo is Cape Ajo, which is a little lower than the former, and level on its summit, but cut down perpendicularly one-half of its height, and forming a small headland at the extremity. Between the capes the shore bends inwards, and has a beach at the bottom; and near Cape Ajo there is a rivulet which runs in a south-westerly direction, and is navigable at low water for small craft up to Ajo, a distance of about a mile from the sea.

About 2 miles from Cape Ajo is Cape Quintres, having an appearance nearly similar, but with this difference, that it is higher and has a whitish colour. From hence the coast runs lower, but is abrupt and has the same colour, to Cape Galisano, a distance of 2 miles, at the same time bending a little inwards, and forming a small rocky bay.

Cape Langre is rather more than a mile from Cape Galisano, the intermediate space being a small bight, in which is a rivulet leading to Galisano. This cape is low and rocky, and has near it a place of the same name.

SANTANDER.—The entrance to this port lies between Cape Langre and Cape Mayor, which are nearly 4 miles asunder. From Cape Langre the coast runs about $1\frac{1}{2}$ mile to the Island of Sta. Marina, which lies very close to the shore, being separated from it by a narrow channel passable for boats. In the middle of the entrance near Point del Puerto, is another small island, named Mouro, which is high and steep, and has a large rock close to its east side, and a shoal at a cable's length to the N.W. of it: in all other respects the island is clean, and has deep water about it.

Cape Mayor, on the western side of the harbour, is of moderate elevation, but steep, and has a lighthouse on it, which shows a light, 298 feet above the sea, revolving once a minute. The flashes, in clear weather, may be seen at the distance of 7 leagues, but if the observer is 40 feet above the sea, they are visible 6 leagues. In gloomy weather, or with the Vientor de Travesia, or wind upon the beam, be cautious not to mistake the distance on approaching the coast.

Cape Menor is about half a mile to the south-eastward of the last-mentioned cape. It is not so much elevated as Cape Mayor, but terminates in a low flat point, with a small reef of rocks below it. Upon its summit is a battery.

A little more than a mile to the south-eastward of Cape Menor is Point del Puerto, the land between bending inwards, and forming a small bay named Sardinero, in which vessels lie when the wind and tide do not serve for entering the harbour. To obtain the best anchorage, bring Cape Menor and Mayor in one, and at 3 cables' length from the former you will find from 10 to 12 fathoms, bottom of sand, but more to the southward it is all rock and stone. At the back of the bay are three batteries, and another, named the Castle of Ano, stands a little from the harbour's point.

From Point del Puerto the coast turns to the south-westward, and at a short distance is the battery of La Serda; it then bends round to Point Promontory, and forms a small bight which is full of rocks. About $3\frac{1}{2}$ cables' length from Point del Puerto, lies a small island named La Torre, which is close to the shore, and is joined to it at low water, and near this is a rock pierced through so as to resemble a bridge, which is named from this circumstance La Isla Oradada, and is clean all round.

About 3 cables' length from Point Promontory is Point St. Martin, with a battery on a precipice, having a number of large rocks under it on the west side. Between these two points is a small rocky bay, with some spots of beach.

Nearly a mile from Point St. Martin lie the Pier and Town of Santander, situated along the shore. Within the pier, vessels lie dry at low water. From the pier the coast runs of middling height, rocky, with some patches of beach, in a westerly direction, for nearly 2 miles, to a small hill named Mount Castillo, which, when seen in this direction, appears to be sharp-pointed, because it lies East and West, and thence the coast runs southward to Maliano Point. The extensive sands on the south side of the harbour frequently shift, and a considerable portion of them dries at low water.

With strong N.W. or S.W. winds, and a heavy sea rising, it is extremely difficult to gain the harbour. In that case, it will be more prudent to drift with the tide for the roadstead of Point Promontory, and there wait for a change of wind, or, with an ebb tide, it may be safer to run for the roadstead of *Sardinero*, the northern shore of the harbour, from Cerda Battery to Point Promontory.

Should it blow from the N.E. or S.W. you may enter by the channel between the Islands of St. Marina and Mouro, or by that between Mouro and Point Puerto, as both channels are clear and good. Having passed the point, you will see the perforated rock named La Oradada, which stands at the distance of 3 cables' length to the eastward of it. This islet is clear on its south side, and is to be left on the starboard side; but, having passed it, you must have a pilot for proceeding up the harbour. Here, with a southerly wind, which blows very hard in winter, the anchors frequently come home.

It is high water here, on the days of full and change, at 3h.; spring tides rise 13 feet, neap tides 9 or 10 feet, and more when the wind is from the N.W. The stream of ebb is stronger than that of flood, and runs at the rate of 8 miles an hour. Within St. Marina's Island a branch of it sets to the S.E., towards the sand to the southward of that island; this is deserving of notice, because many vessels have suffered from ignorance of the fact.

The following remarks upon the harbour are from the pen of Mr. J. G. Northcote, late master of H.M.S. "North Star":—

"In making for Santander from the westward, the first remarkable part of the sea-coast is a large white sandy spot, which lies at the foot of a haycock-like hill; this spot is a little to the eastward of St. Martin, and about 9 miles from the entrance of Santander, between which the land is moderately high and flat, with several watch-towers, a grove of trees, and a signal station.

Cape Mayor, on the starboard side of entrance, is rather more elevated than the line of coast, ends abruptly, and has a lighthouse on its summit. S.S.E. from this is Cape Menor, which ends in a low flat point, with a reef of rocks running off a short distance, which are steep-to. Point del Puerto bears from hence S. $\frac{1}{2}$ E. $1\frac{1}{4}$ mile, having between them a roadstead, where vessels may anchor in moderate weather, with Capes Mayor and Menor in one, in from 12 to 10 fathoms. sandy ground; a short distance within these marks the ground is foul.

"E.N.E., half a mile, from Point del Puerto, and S.S.E. $\frac{1}{2}$ E., $1\frac{1}{4}$ mile, from Cape Mayor, is the Island of Mouro, which is steep-to, except to the N.N.W., where, at the distance of half a cable's length, is a rock with only two fathoms water on it. Between this and Point del Puerto the channel is perfectly clear, and the least water is $5\frac{1}{2}$ fathoms.

"Having made the port, which may be taken at all times with the winds from N.N.E. round by E. to S.E., you may sail on either side of Mouro; and when you pass Point del Puerto, which is steep-to, bring Mount Castillo (which is a hill like a haycock, to the westward of Santander) open of the Oradada Rock, and steer for it until up with the Island Latorre, when you may incline a little northerly, towards Point Promontory, and bring Mount Castillo in a line with the extreme point of St. Martin: steer thus, and it will lead you through the North Channel, in from 6 to 8 fathoms to the Basin, where you may anchor in 6 fathoms at low water, with the Castle of St. Martin N. 67° E., Point del Puerto S. 88° E., and Marnay Island S. 26° W. Moor with open hawse to the southward during the winter, with a long scope of cable on the best bower.

"Having made the port with the wind at all westerly, it will be impossible to gain a safe anchorage in the harbour against the ebb tide: it is therefore advisable to wait in the roadstead of Sardinero, for the flood, then taking the western channel, which is preferable in this case; and with your ship under such sail and command as to ensure her "staying," proceed as before, and when Mount Castillo is well open of Oradada Rock, lay your ship's head to the northward, and back and fill up the anchorage, bearing in mind that two-thirds of the way across to the southward, the tide sets to the S.W. and round Passage Point sand.

" Since the harbour was surveyed by Tofino, in 1788, the banks and channels have very much altered. Observe—

1. The southern channel laid down in his chart does not exist, there being only 4 feet water where he gives $3\frac{1}{2}$ fathoms, and is in some parts dry at quarter flood.

2. The northern channel, described in the Directory as being seldom used, is the only navigable one, and is of a good depth.

3. The Oradada Rock is steep-to only to the southward, being connected to the main by a ridge of rocks, on which the sea breaks with a moderate swell.

4. This harbour should not be attempted by a stranger under any circumstances, as the tides are strong and the banks frequently shift; it will also be impossible to gain a safe anchorage against wind and tide. The pilots are well up to their business, and wait in bad weather under the lee of Point del Puerto until you round it."

The following directions are those by Mr. H. J. Loudon, master of H.M. steam-frigate Gorgon.—*Nautical Magazine*, 1839, page 227.

"Santander is the best harbour on the north coast of Spain, eastward of Cape Ortegal, but there is little doubt that it is filling up, and that the channel and even the anchorage now used, may in a few years be impracticable. The directions given by Tofino will now lead any vessel high and dry, and are as unsuitable now as the following may become in a few years.

"The lighthouse standing on Cape Mayor, may be seen 7 leagues off, so there is but little difficulty in making the port.

"Mouro Island lies in the entrance of the harbour, and may be passed on either side, but not within half a cable's length on the western side. After passing Mouro, in steering for Point del Puerto, a little islet with a hole in it, named Oradada, will be observed. Give it a berth of a cable's length in passing; then bring a clump of trees (on the land over the N.W. part of the town) on with the south end of the long red-tiled house in St. Martin's Fort; or, the cathedral open of St. Martin's Point. Either of these marks lead nearly up; when getting close over to the northern shore, the bluff of Cape Quintres (seen astern over Marina Island) on with the door in the white wall at Point del Puerto, will lead to the anchorage. Should the wind be from the westward, it is advisable to back and fill up, which is easily done with the flood-tide, the distance not being above two miles. The best anchorage is in $4\frac{1}{2}$ to 5 fathoms, with the door on Point del Puerto (in the wall) on with the bluff of Cape Quintres, and the red-tiled house in St. Martin's Fort in a line with two others farther up the hill to the N.E.

"Santander, in N.W. gales, should not be attempted if the vessel can keep at sea; and even after the gale for a day or so, it should be approached with great caution, so that the approaching vessel get not so far embayed as not to be able to haul out again should the bar (as it may be termed) be up; when that is the case, from Mouro Island to the Point del Puerto, and across the Puntal Sand, is one confused sea of breakers, as awfully heavy as can be imagined, from the sea breaking in 7 or 8 fathoms; so the chances are that any sailing vessel would ship some of those seas, become unmanageable, and be lost on the Puntal Sand

"On the 24th December, 1838, 2 A.M., strong N.W. gales, with heavy squalls, hail and rain, H.M. steamer, Gorgon, wore, and stood in for Santander, at 8 A.M. Santander Lighthouse bore S.E. by E., 2 miles, and not expecting the entrance of the harbour to be in the state in which we found it, (*the sea breaking entirely across it as described above*) we went on until there *was no alternative but to push in*. The ship being a very powerful steamer,

and possessing the most excellent qualities, succeeded in getting in, through the most awful sea of breakers ever witnessed by any on board, and she brought up in safety. About two hours after, a schooner attempted it, and was driven high and dry on the Puntal Sand; fortunately the crew were saved. Soon after her, a fine barque, of about 300 tons, made the attempt, and was dashed to pieces on the Puntal Sand; out of 25 persons, two only were saved. These instances, if known, will surely deter any one from attempting the harbour at such a time, unless absolutely obliged by loss of masts, &c.

“There is generally a strong set to the eastward, so that any vessel keeping to sea, must expect to get far to leeward, and every advantage must be taken should the wind veer at all, to get to the westward.”

THE COAST WESTWARD TO CAPE DE TORRES.—About a mile to the westward of Cape Mayor is Cape Lata, which is rather lower and rocky, the shore between them making a steep rocky bight. From Cape Lata the coast runs lower and rocky a short distance to a small point, and then trends somewhat more to the southward, for a distance of nearly a mile, to Port San Pedro, a small shallow bay used by fishing-boats in north-easterly winds. An irregular coast trends hence to the watch-tower of St. Juan, and thence to the Point of Somocuevas, with many rocks close to the land. Within this extent are the Heights of Liencres, a considerable hill, having at each end a small peak. These heights, being visible at a great distance, serve as a good mark for vessels passing this way to Santander.

About $2\frac{1}{4}$ miles from the Point of Somocuevas is the Point of Suances, which is low and rocky, and may be known by the little island which lies off it. The point and watch-tower of St. Justa lie rather more than a mile to the westward of this island, and at $2\frac{1}{4}$ miles from the Point of St. Justa is that of Calderon. Here the coast is steep and level, and forms a small bight studded with rocks.

From Calderon Point the coast trends to the southward of West, nearly 4 miles, to the west point of St. Vincente de Launo, on which is a hermitage. To the eastward of this point there is a small bay with some beach, and a rivulet used only by a few fishing-boats.

Three miles hence to the westward is the east point of the opening of Cumillas, which is high and level on the summit, but perpendicular towards the sea, and has a reef before it. At $1\frac{1}{4}$ mile to the westward of this point is the west point of Cumillas, on the south-east side of which is a rocky islet having, on the land side, a pier for small craft, which lie dry at low water.

The eastern point of CAPE HOYHAMBRE lies N.W. $\frac{3}{4}$ W., 2 miles, from the west point of Cumillas. Between is the Bay of Rabia with its river, which is barred at low water. Cape Hoyhambre presents towards the north a face of one mile in length, of moderate height, but steep, and of a white colour: it is bordered with a shoal, to the extent of a cable's length outward.

ST. VINCENT DE LA BARQUERA.—This harbour lies to the south-westward of Cape Hoyhambre, and can receive such vessels only as do not draw more than 12 feet water. The bar at the entrance seldom changes, and at low water is barely covered. The Isle del Callo marks the west side of the entrance, and has a small channel within it, but it is shoal. The harbour is too dangerous to be attempted at any time without a pilot, but should necessity compel you to run for it, you may use the following directions:—

In order to enter over the bay, on the west side of the Isle del Callo, you must keep very close to it, and when you are abreast of its S.W. point, steer on to a house, named La Marea, bearing from you to the S.E. It is high, and stands on the N.E. end of the bridge. You will thus stand on until you

discover the first house in the town, and then steer towards it until you see the middle of the town, when you will have passed all dangers, and must run within a ship's length of the western shore, and there anchor abreast of the Chapel of Na Sra de la Barquera, in $3\frac{1}{4}$ fathoms, muddy bottom. On account of the narrowness of this situation, it is necessary to moor both head and stern.

On the other hand, in going in by the east side of the island, you must keep close to it until you come near its S.W. point, and then follow the directions just given.

Between St. Vincent de la Barquera and Cape de Mar the coast is variegated, and contains many inlets which afford no shelter to shipping. Cape Prieto lies about 22 miles to the westward of St. Vincent; is of moderate height, surrounded by rocks, and has a watch-tower on its summit. On its east side is the mouth of the River Niembro, which is resorted to by the coasters.

Cape de Mar lies rather more than 5 miles from Cape Prieto, and is of moderate height, perpendicular over the sea, but free from rocks, and has a hermitage on its summit. Between the headlands the land is as high as at the cape, and along shore are found, a large rock under the Tower of Prieto, the Point and Island Desuracado, and the small Bay and Beach of Carneros.

The Riva de Cella lies $7\frac{1}{4}$ miles, N.W. by W. $\frac{1}{4}$ W., from Cape de Mar. The harbour is obstructed by a bar of sand, having only five feet over it at low water. Off the eastern point lies the Serrapio Reef, on which the sea breaks when there is a swell, although there seems to be a good depth over it. Two miles to the westward of Riva de Cella is the Point of Carreros, which is low and so surrounded with rocks, as to require a berth of one mile at least from vessels when passing. Misiera Point, having a battery, is nearly 7 miles from that of Carreros, but there is between them no place of shelter, with the exception of the little cove of Lastries, which has clean and good holding-ground. Cape Lastries is more than one mile and a half from Point Misiera. It is high and abrupt, of a red colour, and has a ledge of rocks without it.

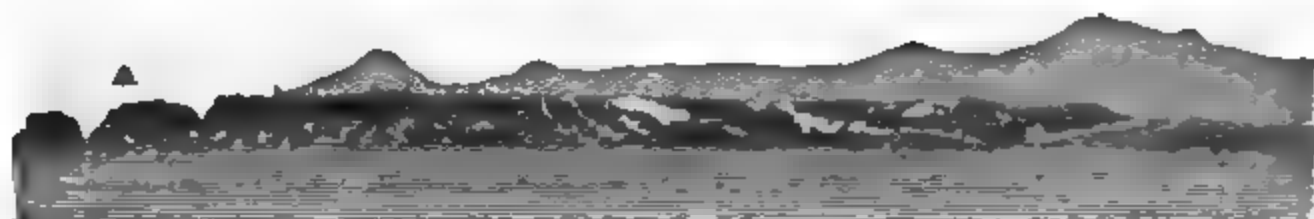
Four miles, N.W. $\frac{1}{4}$ W., from Cape Lastries is Tazones Point, on the east side of which is the entrance of the River Vella Viciosa, an inlet capable of receiving vessels drawing 12 feet, but at high water only. In the middle of its entrance there is a rock, and none should venture in without a pilot. Between Tazones Point and Cape St. Lorenzo, an extent of 10 miles, the shore is dreary, having only a few creeks and rivulets. About two miles from Cape St. Lorenzo is St. Catherine's Point, with its chapel; the outer part is steep, and on the slope inland stands the town of Gijon. Beyond this point, at rather more than two miles, is Cape Torres, with an inlet at its base named Orrio.

GIJON.—This bay or road, lies between St. Catherine's Point and Cape Torres, and affords good anchorage in easy weather, but is open to the North and N.E. Should a large ship, in summer, have occasion to let go an anchor here, it must be with Orrio Island, off Cape Torres, in a line with the town of Candas, lying $3\frac{1}{4}$ miles to the N.W. of it, and in 11 fathoms, dark sand. Even here care must be taken to be ready to get under sail, in case the wind should change to blow on shore, which is frequently the case, even in summer, and the sea is then so very heavy as to render it almost impossible to get out of the bay. Those heavy on-shore winds commonly last two or three days, and that from N.E. is most prevalent. Small vessels may take the pier of Gijon, but they must be conducted by a pilot. On the bar are 9 feet at low water. The vessels within the pier lie dry at low water.

From Cape Torres to Cape Penas the coast is foul and dangerous. At *Luanco* is a small cove and pier, only fit for small vessels. Off the point of

the same name is a rocky islet, named Labaca de Luanco. Cape Penas, on the north, presents a broad steep head, of nearly one mile in extent. Its summit is level, and it appears of a whitish colour. The foul grounds about this cape are very extensive, and large ships should never approach it within the distance of 4 miles.

On the summit of the cape there is a lighthouse showing a light with eclipses at intervals of 30 seconds, which may be seen 20 miles off in clear weather.



Cape Penas (A) bearing S. 57° E. (true), distant 5½ leagues.

The coast from Cape Penas continues foul to Cape Vidio, an extent of 20 miles, and in no part does it afford shelter for a stranger. Cape Busto, which is high and steep, is 9½ miles, W. by N., from Cape Vidio; a ledge of rocks extends from it to the N.W.; and East from it, at the distance of seven-tenths of a mile, is Serron Islet, in shape like a pyramid, and, therefore, serves as a mark for the cape. Between these capes the coast generally is rugged, and bordered with islets and rocks, some above and many under water. From Cape Busto, westward, the shore continues foul to the River Navia, a distance of nearly 4 leagues. From this river the coast continues very rugged, like that to the eastward, to the islet named Orrio de Tapia. From this islet to Point Rumeles, the eastern point of the harbour of Rivadeo, the bearing and distance are W. ½ N., 3½ miles; in this track are some inaccessible coves, the Pantorgas Rocks, and the Moulas Shoal.

Before we conclude this article on the coast of Asturias, we would observe, that it is the part of the north coast of Spain which requires the greatest care and attention, being entirely lined with ledges of rocks and dangerous shoals. And, although large vessels generally keep much farther off the land than is necessary, yet we must strongly recommend it to small vessels to omit no care or precaution on this hazardous tract of shore; the assistance of pilots, or a perfect knowledge of the harbours they mean to touch at, being absolutely requisite in approaching them.

RIVADEO.—This harbour may be readily found by the mountains of Mondego and St. Mark, which appear to the S.S.E.: the first is very high, having on its tops some white rocks, which, at a distance, appear like buildings. St. Mark's is low and round, having a hermitage* upon it. Vessels drawing 16 to 18 feet water must run up in mid-channel, until Point Castrellias is open to the southward of its islets and rocks, whence they make over to the western shore, and anchor opposite to Damian Castle, or a little to the southward of it, in 5 fathoms, sandy bottom: as the channel is here narrowed by the bar, which extends to the N.E., they should moor with 4 anchors, head and stern, as even the south wind at times blows here with great violence.

Remarks by Lieut. Com. Hon. E. Plunkett, H.M. Ship "Savage," 1840:—"There have been no alterations in the positions of the shoals in the Port of Rivadeo since the survey made by Tofino, though there is somewhat less water near the entrance. As an anchorage it is small and inconvenient, it

* It is said that there are now no traces left of this hermitage.

being necessary to moor head and stern, with cables to the shore. There is no proper berth for a large ship, and not more than five or six vessels, drawing 12 feet water, can lie in safety. There is a good watering-place at Castropol, about one mile from the anchorage, where boats may fill at high water, and fresh beef may be procured at a low price."

From the entrance of Rivadeo, at the distance of 20 miles, N.W. $\frac{1}{4}$ N. (by compass), lie the Farralon Rocks of St. Cyprian, between which and the shore is a passage of 13 or 14 fathoms, sandy bottom. In the tract of coast between are some small rivers, but they are hardly accessible, even for small craft, at high water; before the last of these rivers is Suela Islet which affords shelter in winds from W.N.W. to E.N.E., and sufficient room for a large vessel in case of necessity, in from 3 to 4 fathoms, sand and good holding-ground.

From the northernmost Farralon, distant a little more than 3 miles, N.W. $\frac{1}{4}$ W., lies Point Roncadoira; and midway between is Portizuela River, at the foot of Monsancho Mount, which is very sharp on the top, and which, with the Islet Anseron, is a good mark for the shore. W. by N., $1\frac{1}{4}$ mile, from Point Roncadoira, is Sainas Point; and at 2 miles, W.S.W. $\frac{1}{4}$ W., from the latter is the Point of Faro, appearing beneath a hill of the same name, on which is a watch-tower.

PORT VIVERO lies between the Points of Faro and Socrasto; it is clear and deep, and a ship may tack in it with safety, but it is open to the north. The best anchorage is with the east side of Queimada Isle on with the S.E. side of Gaviera Isle, and Puntal Point in a line with the southernmost houses of Sillero; here is a depth of 5 fathoms, clayey mud. The ship should lie east and west, that the cables may have an equal strain in southerly winds, which, in summer, blow hard, and also in the heavy sea which frequently sets in from the North and N.W. It is necessary to weigh the anchors from time to time, because, if they remain long in the ground, they will not be raised without difficulty, if they be not totally lost.

Remarks by Lieut. Com. Hon. E. Plunkett, H.M.S. "Savage," 1840:—"Port Vivero is only four miles to the eastward of Barquero, but can scarcely be considered a safe anchorage, except in the summer months; though it is only open to two points of the compass, viz., from N.N.E. to N.E., and is consequently from appearance better sheltered than Barquero, yet a north-west gale will send home a very heavy sea, and a northerly gale will blow directly home. The holding-ground is, however, very good, and the shore perfectly clean and steep on both sides, so as to allow of a ship working out when the water is smooth; but this would be impracticable with the wind fresh from the northward.

"From enquiry made among persons best acquainted with the coast, and the appearance of the bay itself, I am led to think no ship should anchor there during the winter months. It is very rarely visited by any description of vessel, and only in the summer time. The near neighbourhood of so superior an anchorage as Barquero, deprives Vivero of any value it might have had for ships requiring water and fresh provisions. It has a tolerable good watering-place, and the fresh meat is good."

VIVERO TO CAPE ORTEGAL.—From the Point of Socastro, at the distance of 2 miles, N. $\frac{1}{4}$ W., is Point Ventosa. The bay between is named St. Roman; and at $2\frac{1}{2}$ miles from Point Ventosa, N. by W. $\frac{1}{4}$ W., is Cape Vares, which is high and steep.

ROAD OF VARES OR BARQUERO.—Remarks of Lieut. Com. Hon. E. Plunkett, H.M.S. "Savage," 1840:—"The want of any commercial town in the neighbourhood, which renders this harbour of no value to commerce, suffi-

ciently accounts for its being still neglected; but as an anchorage for a fleet, or for men of war of any description, it possesses advantages not to be found in any other point on the north coast of Spain.

“ It is sheltered from every wind except those from N.E. to S.E. a quarter from whence it rarely blows with any force. It is easy of access with all winds, has very good holding-ground, and is perfectly clear and free from rocks close to the shore. It is sufficiently spacious to contain a large fleet, and has three excellent watering-places, where boats may water with great convenience. A good supply of fresh meat may be obtained at a very low price, and fuel may be procured, though not in the immediate neighbourhood. These circumstances seem to recommend it as a place of rendezvous to a fleet, or cruising ships, requiring a refit, or in want of water, &c. It may be also very useful to vessels unable to weather Cape Ortegal in westerly gales, and is often entered by Spanish vessels under those circumstances. In the heavy gale of last winter (1839-40), there were at one time twenty-two vessels at anchor in the inner roads, named El Vicedo, where they remained perfectly sheltered.

“ The entrance of Barquero is easily distinguished, especially in coming from the northward or westward, when its distance from the remarkable point of Cape Ortegal will serve as a guide; it may be further known by the promontory about $1\frac{1}{2}$ mile in extent, whose western extreme is named Estaca, and which runs down rugged and irregular to the sea, with several small pointed rocks or islands off it. The eastern extreme of the projecting land is named Cape Vares, and the land between the two points is high and steep over the sea. On each side of the promontory is a deep bight, the one being the Harbour of Barquero, and the other the inlet of Santa Marta, which latter is not an anchorage.

“ In approaching the land from the northward or westward, the Island of Conejara, which forms the eastern point of the Bay of Barquero, will be seen, and the sandy beach at the bottom of the bay. On the hill above Point Camero, at the eastern entrance, is a low square look-out station.

“ In choosing a berth, regard should be had to the time of the year, the prevailing winds, and the object in view. Ships driven in by stress of weather during the north-west gales in winter time, would do well to run along the weather or western shore, at about 3 cables' length, and when nearly abreast of Point Almeiro, with Cape Vares about N.E. $\frac{1}{2}$ E. and Conejara Island S.E. $\frac{1}{2}$ E., to come-to with the small bower in 8 fathoms, so as to moor N.W. and S.E. with open hawse to the north-east; in this position a vessel will be well sheltered by the land, and will have ample room to veer or to weigh, if desired.

“ Should the sea in the offing be very heavy in a north-west gale, some cross swell will come into the bay round Cape Vares, and the smoothest water will then be found farther to the south-east, in the inner roads, named by the pilots Vicedo. It was in this part of the anchorage that twenty sail of merchant-vessels rode out the heavy gales of 1839-40.

“ The marks for this anchorage are to bring the Point of Cueva-baja on with Point de Cruz (the south point of Conejara Island), and a long, low, one-story house standing by itself on the beach of Elle Valle on with Point Videiros bearing S.S.W. But large ships should anchor with Cape Conejara Island open nearly its own breadth of the main land, at the entrance of the harbour in 6 or 7 fathoms. In the southerly gales which are very heavy on this coast, though unattended with sea, this part of the anchorage will also be preferable, as well as with south-east winds. It is also more convenient for ships having to water, the best watering-place being close to Conejara

Point, on the south-east side, under the village of El Vicedo. There is however an excellent run of water on the opposite shore, near Point Campelo, where two or three ships' boats can water at the same time even at low water; at present ships find some difficulty in watering both at Corunna and Ferrol, having to get casks out of the boat.

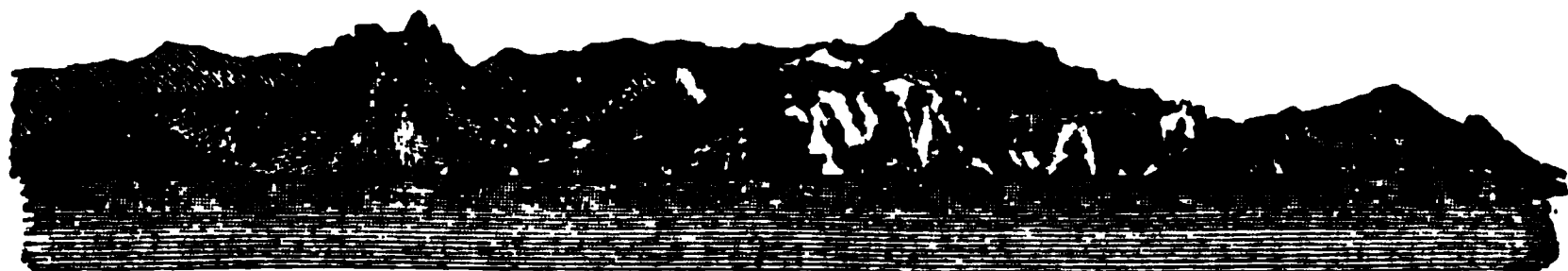
"Though particular marks have here been given for the best anchorage, ships may anchor in any part of the bay after bringing Cape Vares to the eastward of N.N.E., which will give them sufficient shelter in north-west gales. The bottom is everywhere clean with excellent holding-ground, and as the soundings are regular, and the shore free from sunken rocks, the largest ships may work in and out with perfect safety, and without any pilot or previous knowledge of the place.

"Although Vares or Barquero as a harbour is not equal to Ferrol or Corunna, it offers some advantages not possessed by either of those ports. It is easier to make in thick weather, the coast is perfectly clear and bold, and in approaching it in westerly gales, you do not, as at Corunna or Ferrol, run down on a lee shore and get embayed. Ships may enter Vares with the heaviest gales at S.W. or N.W., and on sailing from it with these winds, they will be at once clear of the land, as the entrance of the harbour is the most northerly point of the whole coast.

"Exclusive of Vivero, which is not a safe anchorage for winter time, there is not a single harbour to the eastward of Vares that is suitable for large ships, and accessible in N.W. gales. Its only disadvantage consists of being open to easterly winds, which blow with greater force on this part of the coast, than further eastward: but it appears from the statement of the inhabitants and others, that these winds are never accompanied by any sea to endanger a ship at anchor, and this is confirmed by the appearance of the shore itself, which does not show the usual marks of a heavy surf, when exposed to the easterly winds. The vegetation on the sides of the harbour, extends nearly to high water mark, a certain proof of its not being washed by the sea."

POINT ESTACA, in latitude $43^{\circ} 47' 50''$ N. and longitude $7^{\circ} 43' 5''$ W., the northernmost point of the coast of Spain, is distant 13-5th miles from Cape Vares, the shore between being high and precipitous over the sea. At the distance of nearly 7 miles, W.N.W. $\frac{1}{4}$ W., from Point Estaca is the Cape of the Aguillones, which is high and steep. The Aguillones is a cluster of islets a little to the northward of the cape, being separated from it by a narrow channel. The Bay of Santa Marta, which lies between Point Estaca and Cape Aguillones, affords no place of shelter for shipping.*

CAPE ORTEGAL is high and precipitous, and lies in latitude $43^{\circ} 46' 40''$ N., and longitude $7^{\circ} 53' 9''$ W. A shoal lies N. by E. from it, distant half a mile. A good mark for distinguishing it from seaward is a watch-tower on the highest land, at a mile and two-fifths from the cape to the southward.



A. Cape Ortegal S. 55° W. (true), distant $6\frac{1}{4}$ miles. B. Point Aguillones S. 46° W.
C. Poblacion de Carino.

* We have been informed that there is a lighthouse on Point Estaca showing a revolving light. If so, we have met with no official notice of such a light being established.

At a distance of 7 miles, W. $\frac{1}{4}$ S., from Cape Ortegal is Candelaria Point, having a watch-tower near it. All the coast between is steep and rugged. Point Pantin, the west point of the little harbour of Cedeira, is 3 miles, S.W. $\frac{1}{4}$ W., from Point Candelaria. A ledge of rocks extends to the northward from Point Pantin, and Tofino says "we learned from the information of the fishermen, that a shoal lies N. 22° E. (true), distant $1\frac{1}{4}$ mile, from the point, which has only 3 fathoms over it. This is probably the top of some sharp rock, very difficult to be observed in good weather, when the sea does not break on it; and on this account, perhaps, it has not been discovered by persons who have gone out purposely to ascertain its position, and other particulars."

CEDEIRA.—This harbour, though small, has good holding-ground, but open to the N.W., and adapted only to small vessels. On entering from the north-westward, Point Pantin must be passed at the distance of a cable and a half's length, so as to clear the Meixones reef; and at the same distance from the opposite shore, so as to clear the White Rocks. Hence you advance to Serri-dal Point, and run along shore to abreast of Solveiras Point. Within the latter, anchor with the flag-staff of the castle in a line with Point Pantin. Here are from $2\frac{1}{4}$ to 3 fathoms, sand. Vessels generally moor North and South. A troublesome sea always accompanies north-westerly winds.

W.S.W. $\frac{1}{4}$ W. from Point Pantin, distant $5\frac{1}{4}$ miles, is the Point of Frouseiras; and 6 miles, W. $\frac{1}{4}$ S., from the latter is Cape Prior, which is nearly a mile and a quarter in extent, and bordered with rocks on the eastern side, to the distance of a cable and a half. Between the two capes the only remarkable object is Mount Campelo, near the shore, which has a sharp summit, with a watch-tower on it.

Cape Prior may be well known by a low sandy beach to the eastward, and another to the southward, which appear to join each other, making the cape look like an island. It may be here proper to remark that several rocks lie between Cape Ortegal and Cape Prior, over which the sea breaks with a swell; the current sets in to the land, and, with light winds, it requires great vigilance to prevent being embayed or driven on shore; but large ships, with a good steady breeze, may pass on even within two miles of Cape Ortegal. All along this coast the tides rise about 15 feet, and it is high water about three o'clock, full and change.

About one league to the southward of Cape Prior, are two large rocks named Gabeiras, high, steep, and separated from the land, having, it is said, a passage for boats between. Cape Priorino is $2\frac{1}{4}$ miles to the southward from the Gabeiras; it is not so lofty as Cape Prior, but more clear at its base, and has a shoal close to the land on its south side. Behind the cape is Mount Ventosa, having a watch-tower on its summit. From Cape Priorino the coast to the S.E. forms a slender bay to Little Cape Priorino, which has a broad appearance, and is considered a good distinguishing mark for the entrance of Ferrol.

FERROL.—On the south side of the entrance is Point Segano, high and steep, having upon it a battery and a watch-tower. Near its point is a sunken rock named La Muela, covered with weeds, and having only one fathom over it at low water. Between this rock and point is a depth of $4\frac{1}{4}$ fathoms, and the passage may be used, in case of necessity, by a small vessel.

On the north side is Point St. Carlos, forming the narrow entrance into the harbour, which is only one quarter of a mile in breadth. St. Philip's Castle is three-quarters of a mile within that of St. Carlos, on the same side; its walls are washed by the sea. The south side of the Narrows is protected by the Castle of St. Martin, situated on a point which reduces the channel here to

one-fifth of a mile. At half a mile within this is the Castle of Palmas, and next is Point Rodonda, or Round Point, where the coast forms an inlet named Bano Cove.

Ships bound in with an adverse wind, if it be not very strong, may, by a few tacks, gain the Bay of Carino, between Little Cape Priorino and St. Carlos Point. Here they may come to, in from 14 to 8 fathoms, sand, and be sheltered from winds at N.W., North, and N.E. Be ready, however, to take advantage of the first breeze from S.W. to gain the harbour, as the winds in this direction are the most dangerous hereabout. Should the wind prevent you turning into this bay, the only resource is to run for Corunna, and there await more favourable winds, &c.

The winds for entering the harbour are those from between S.W. by the west to north, by compass. With these you may pass to the southward of Cape Priorino, at the distance of half a mile or less, if required. Hence run up in mid-channel, keeping over rather to the north or south shore, according to the wind, and observing that, from St. Philip's Castle, a small ledge of sunken rocks extends about 30 fathoms to the southward, over which there is at low water only 2 and $2\frac{1}{4}$ fathoms; and from Palmas Castle there is a similar one, stretching out to about the same distance. From Point Rodonda a reef also extends about 40 fathoms to the N.E., with 1 to $2\frac{1}{4}$ fathoms over it; and there is a sunken rock just without Bispon Point. With the wind large, there will be found no difficulty in keeping clear of these dangers.

Having passed the Narrows, you may come to an anchor wherever most convenient. It is usual to moor N.E. and S.W., so that in going in with the wind at S.W. you first let go the anchor to the port bow, or the contrary, according to circumstances. There is rocky ground about the length of a boat, lying directly in the fairway between the Mole of Ferrol and Seixo Point, on the opposite side. A leading mark to clear them on the south, is Bispon Point in a line with the bottom of St. Philip's Bay. With equinoctial gales the tides run in strong, at which times it is always advisable to go in or come out of the harbour one hour before either high or low water, that you may head the current; this is more requisite when many ships are passing, but otherwise you may wait till the turn of tide. In these gales the tides rise nearly 15 feet, being nearly 2 feet more than they do at ordinary spring tides.

FERROL TO CORUNNA.—S.S.E. $\frac{1}{4}$ E., $1\frac{1}{4}$ mile, from Little Cape Priorino is Point Coytelada, and S.S.W., at the distance of 3 miles, from the same cape is La Marola Rock. Between these points is the entrance of the Bays of Ares and Betanzos, which present nothing remarkable that may not be understood on reference to the chart. The coasts in general are rocky and precipitous. Seixo Blanco Point, on the N.E. side of the Bay of Corunna, is high and steep, and visible at a great distance, appearing like a roadway down to the water. The coast eastward hence to Torella Point is equally high and steep. All vessels approaching the coast hereabout must be very cautious in running for shelter into the Bays of Ares and Betanzos, being entirely open to the wind and the sea; and it is to be remembered that south winds here are extremely dangerous.

CORUNNA.—The Tower of Hercules, or Lighthouse of Corunna, bears S.W. $\frac{1}{4}$ W., $5\frac{1}{4}$ miles, from Cape Priorino. It is a very singular building of three sides only, forming an equilateral triangle, having one of its sides N.N.W., consequently its angles bear E.N.E., W.S.W., and S.S.E. Upon the summit of the tower is a lantern, which is 364 feet above the sea at equinoctial high tides, and contains a *Cata-dioptric* revolving apparatus of the 3rd order. The *light is fixed, varied by lustres*; the fixed light visible in ordinary weather at *the distance of 12 miles, and the lustres at 20 miles*. Within the 12 miles,

the light presents the following appearances; the fixed light faint for 107", eclipse for 39", lustre 13", eclipse 30", the faint fixed light again returning. Beyond 12 miles the lustre only will be seen for the space of some 7" duration, a complete eclipse following for 3 minutes, the period in which the revolution is effected, when the lustre will again appear as before.

At nearly three-quarters of a mile to the eastward of the town is Pradeiras Point, forming the N.W. point of the Bay of Corunna, or the Groyne. There is a small battery on it, and a reef extends from it to a short distance. The Castle of St. Antonio, off Corunna Point, at a mile and a quarter to the south of Point Pradeiras, stands on a great rock detached from the shore, and forms the N.E. point of the harbour. Between the point and castle are several large rocks above water, and the ground on the south side of the castle is likewise foul. The most dangerous spot in the harbour is that to the eastward of the town of Corunna.

On the eastern side of the bay is the Point of Mount Mera, with a battery at about two-thirds of its height from the water. At the bottom of the bay, on the same side, is the Isle and Castle of Santa Cruz. In the small bay, to the S.E. of Mera Point, there is good ground for anchorage, but it should only be used when it is impossible to enter the harbours of Ferrol or Corunna, because a heavy sea is driven into it with the wind at N.W. or North. On the Tonina Bank, which lies off it, there are 10 fathoms at low water, yet the sea breaks on it during a swell.

On the western side of the bay is the Castle of St. Deigo, above half a mile to the southward of the Castle of St. Antonio. These points form the entrance of the Harbour of Corunna. About a cable's length to the northward of the Castle of St. Deigo, is a small shoal with only one fathom at low water; and at N. by W. from the same castle, and S.W. by W. from that of St. Antonio is another shoal of three fathoms. On the Basuril and Cabanes Bank the sea breaks during a swell, notwithstanding the depth of water upon them, so that it is necessary to be attentive when passing between them and the land.

In advancing from sea in easy weather and fair wind, from the N.E. or N.W. quarters, you may steer for the points of Seixo Blanco and Mount Mera, until you observe the Castle of St. Deigo come by that of St. Antonio, taking care to avoid the rocks on the western side; steer on for Deigo, pass Antonio, and, when between these two castles, choose your anchorage. If your ship be large, bring St. Antonio's Castle N.E. by E., and anchor in 6 or 7 fathoms, oaze and mud; a smaller vessel may stand farther in, having St. Antonio E.N.E. or E. by N., or smaller vessels may advance still farther in, always taking care not to anchor in those parts encumbered by the sea-weed, for with heavy gales the anchor will not hold. It is usual to moor North and South.

In attempting the harbour during a gale from the northward or N.W., the passage in is between the Basuril Bank and the western shore, having the Tower of Hercules to the S.W. at such a distance that you can see its base, which should in no case be hidden. Hence you pass Ravaleira Point, and the rocks which lie off it, which may be passed at the distance of two cables' length. Now steer S.E., with the Hill and Battery of Mera a-head, until St. Deigo's Castle, near that of St. Antonio, be brought on, when you run S.W. and enter the harbour, leaving the last-mentioned castle at the distance of a cable's length; then proceed as before directed.

But if you are desirous of running between the Jacentes Bank and Seixo Blanco Point, you must stand toward the mouth of Ferrol Harbour, until Cape Priorino bears N.N.E., then bring Point Segano in one with St. Christoval's Chapel (which is *in the Bay of Corino*), and steer on until the Castles

of St. Deigo and Antonio are in a line, and stand on thus until Seixo Blanco Point bears E.S.E.; from thence steer southward until the Battery of Mera bears E.N.E., then attend to the directions given before.

GENERAL REMARKS.—In making for the Harbours of Ferrol or Corunna, you ought to be very careful to keep off the land at night, for the currents may drift you into danger; perhaps you cannot do better than pass your night in the neighbourhood, or to the westward of Sisargas Islands, standing off and on as occasion may require, for lying-to may be dangerous, and if the wind be from the S.W., you will find a current setting strongly towards Cape Ortegal. Be careful to provide against being driven to leeward of Ferrol, for, with a large ship, no port on this part of the coast can ensure safety.

When blowing from the N.E., you may run within two miles of Cape Prior, and thence steer for Priorino; then, if the gale be not too powerful, you may run for Carina or Corunna. Some dependence may also be placed on your soundings, for, from the regularity of them, and the noise of the sea dashing against the shore, you may, in thick and dark weather, judge by them your distance from the land.

The wind, on the N.W. coast of Spain, is in the summer time most prevalent from the north-eastward. On the coast of Portugal, the winds are generally from the northward, during two-thirds of the year; and at Lisbon it has been found that the wind within varies, at times, from that without the harbour. Thus when the wind in the Tagus is from the S.E. or S.E. by S., that without is frequently no better than S. by E. or South. This difference, however, most commonly occurs in the winter season.

CORUNNA TO FINISTERRE.—About $1\frac{1}{2}$ mile to the eastward of the Tower of Hercules, is a hill of moderate height, named Monte Perraboa. This land, though even on the summit, is perpendicular toward the sea. On the west from the base of this mountain, are three islets, named St. Pedro, which are surrounded by sunken rocks; and at nearly three miles from it is another hill, named Monte St. Pedro, which is round and moderately high; 6 miles farther on is the small harbour of Cayon, which can only admit small fishing-vessels. The low flat shore of Baldayo then runs a considerable way; and about five miles from Cayon is a rocky island close in to the shore, to the northward of which runs a bank of rocks, above 4 miles out; at low water seven of them are visible, but at high water only the middle one is to be seen. Between these rocks and the land is a passage $1\frac{1}{2}$ mile wide, so that vessels may run through in safety, if necessary, there being 14 and 15 fathoms within it.

From the Tower of Hercules to Cape St. Adrian the distance is $6\frac{1}{2}$ leagues. On the N.W. of this cape are the Islands of Sisargas, consisting of several islets and rocks. These bear from Cape Prior nearly W., and from Cape Ortegal W. $\frac{1}{4}$ S., 50 miles. In cases of emergency a vessel may pass between Sisargas and the main, but great caution is required. In the passage the tides set strong, the flood eastward and the ebb westward.

At $3\frac{1}{2}$ miles from hence is Point Narija, of moderate height, and having many rocks running from it; behind which, to the eastward, is the harbour of Avarizo, frequented by coasting-vessels; in entering you should keep to the western shore, which is moderately clean, but far up the water becomes shallow. From Point Narija the shore bends inward, then runs out to Point Roncudo, round which are several rocks and shoals, which, by giving a berth to, may be easily avoided. Point Roncudo is the northern point of the Bays of Corme and Lage, on the N.N.W. and W. shores of which the water is deep enough for most vessels, but the bottom is rocky. W. by N. from Roncudo Point lies a sunken rock, with not more than 3 fathoms over it at low water.

Several rivers, with excellent water, fall into the Bays of Corme and Lage, and a whole squadron may readily be supplied.

The Point of Lage, which may be named the S.W. point of the Bays of Corme and Lage, is above $2\frac{1}{4}$ miles to the S.W. $\frac{1}{4}$ W. from Point Roncudo, and appears high, but is low at the extremity, and a reef stretches from it to the N.W. about two cables' length. A shoal also extends from it E.N.E. to half that distance. Point Catasol, at a mile to the south-westward from Point Lage, is high and of a sandy colour, with large rocks and shoals at its base. The Harbour of Camello at $3\frac{1}{4}$ miles from Point Lage, is a shoal creek used by fishing-vessels only. Ten miles from Lage is Valea de Tosta, very low and encircled with rocks; behind the point, several high mountains rise up with rugged peaked tops. At a mile from Valea de Tosta is Cape Villano, not very high, but perpendicular towards the sea. Within it at a short distance, is a sharp peak of a red appearance, resembling a high tower. N.N.W. from the cape, about $1\frac{1}{4}$ cable's length, is the Bufardo Shoal, small, but peaked at top, the water breaking over it though all around it is deep water.

To the southward of Cape Villano is the Bay of Camarinas, obstructed by rocks, and frequented only by the neighbouring coasters. Off the entrance lies the rocky shoal named the Quebrantes, and the depths over it are from $7\frac{1}{4}$ to 3 fathoms, except at its northern end, where, at low water, it appears above the surface, in shape like a buoy. This rock bears from Cape Villano W.S.W., one mile and a quarter; and at W.N.W. from it, about half a league, is another rocky shoal, over which, with gales from the westward, the water breaks, but not less than 6 fathoms has been found upon it.

Buitra Point, 2 miles to the south-westward of Camarinas Bay, is high and steep; near it are two large rocks above water. Cape Torinana, which lies 5 miles farther, in the same direction, makes a sharp and steep projection into the sea; it is not very high, and when seen from between E.N.E. and W.S.W. resembles the awning of a galley. At a distance it is not always distinguishable from the high land at the back of it. At 2 cables' length, W.N.W., from the point of the cape is a small sunken rock, which breaks with a little swell, and a reef of sunken rocks also runs off it to the north-eastward a distance of one mile.

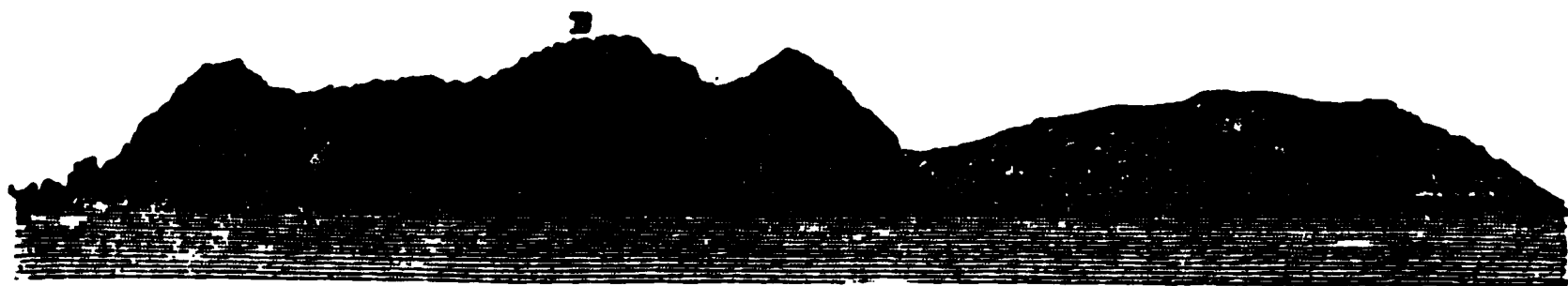
At nearly a mile to the W.N.W. of the cape is a sunken rock named the African, from H.M. steamer "African," which struck on it on the 26th May, 1833. The bearings then taken were Cape Finisterre S. by W., and Cape Torinana E.S.E., distant one mile. In October, 1832, this same rock was observed by Mr W. M. White, acting master of H.M. steam-vessel "Confiance," when the sea was breaking over it. As it is not improbable that there may be other dangers on this coast, masters of vessels must be very cautious in approaching it.

THE NAVE' OF FINISTERRE, a high mountain so named, stands at the distance of 9 miles to the S.S.W. from Cape Torinana. Its summit is flat, and at about one-third of its height from the sea, there appears to be a short point with hummocks on it, and having at its base a small but high island. In the bay formed between Cape Torinana and the Navé of Finisterre, vessels may safely anchor during north-easterly and easterly winds off a fresh water rivulet, in from 6 to 8 fathoms, sandy bottom; but not in deeper water, as there the bottom is rocky. Care must also be taken not to advance too near the north shore, as it is also foul.

At $1\frac{1}{4}$ mile, N.W. by W., from the Navé Point, is a small ledge named the Munis Rock, upon which the sea breaks in bad weather. Upon this shoal there are 3 fathoms at low water, and close to all round are 20 to 30 fathoms.

CAPE FINISTERRE may be readily known from sea, there being a bight be-

tween it and the Navé, with low land.* As there are no appearances like this on the neighbouring coast, it cannot fail to be recognised. To the northward of this cape lies the little rocky Island of Centolo, which is of moderate height and steep, and between this island and the Munis Rock, is a small ledge named Carraca. At three cables' length, S.S.W., from the same cape, there is a sunken rock, about the size of a man-of-war's boat, named Turdeiro, which has over it only $2\frac{1}{2}$ fathoms of water, and a short distance to the southward of this, is a small shoal of $5\frac{1}{2}$ fathoms, named Peton de Socabo, upon which the sea breaks in bad weather. In advancing from the S.W. towards this rock, Mount Lizaro will be seen to the eastward, and may be known not merely from its height, but from its singular formation, as its summit consists of an assemblage of small pinnacles, resembling the teeth of a saw.



Cape Finisterre (Point A.) ; Point B. bearing North, distant 4 miles.

Within Cape Finisterre the land for more than half a league to the N.E. is high and precipitous. Here stands the town situated on a cove, and inhabited by fishermen, who have a small pier for the protection of their boats. To the eastward of the town there is good anchorage and shelter during N.E., N., and N.W. winds, in from 12 to 24 fathoms. In the summer when the N.E. winds are of long continuance, this place is much frequented, but as soon as the wind appears to be getting round to the S.E. or S.W., it is necessary to put to sea.

E.S.E., $4\frac{1}{2}$ miles, from Cape Finisterre, there is a large cluster of islets and rocks named the Great Lobeira ; at half a cable's length on all sides, the ground is clear and the water deep. The Little Lobeira which is a similar cluster, although of a smaller size, lies S. by E., one mile, from the former ; its rocks are of all sizes, and small fishing-vessels, at times, pass among them at high water. About this cluster the ground is foul ; and a reef extends from it to the shore, a distance of $1\frac{1}{2}$ mile to the S.E.

CORCUBION BAY lies to the eastward of Cape Finisterre, and runs in northerly about 2 miles the whole shore being high and clean, with several small coves and spots of beach, two of which only are in the bottom of the bay. On the west side of the bay is the town, and on the east side, which is called Fernelo, is a small river, and farther in, on the same side, lies the town of Pueblo de Cé. About the middle of the bay are two castles, the one on the east side is named the Prince's Fort, and that on the west shore, the Cardinals'. Between these forts the distance is about three-quarters of a mile, but the bay becomes narrower as you proceed towards the town.

This bay is suitable for vessels of all descriptions, as it is sufficiently deep and clean. The anchoring-place for large vessels is between the forts, in a depth of 11 fathoms, gradually diminishing to within 2 or 3 boats' length of both shores. If desirous of going farther in, you may come-to, in about 8 fathoms, abreast of the low beach of Fernelo, the only one on the east side ; but it is not prudent to stand so far in, especially in winter, lest the wind come round to the southward, as it is always accompanied with a heavy sea ;

* We have been informed that there is a light on this cape, but have met with no official notification of such being established (1853).

so that a vessel would ride very near the shallows in the bottom of the bay, and have no room to let go an anchor in case she should either drag, or part with those already out.

To enter this harbour, with winds from the S.E. and S.W., steer for Great Lobeira; the ground is clean, and the water round it deep. When abreast of it, stand on for the bay between the Little and Old Corromeiro Rocks, where the channel is $1\frac{1}{2}$ mile broad: between the rocks and the land it is not more than half a mile in breadth, but clear of danger, and with 17 fathoms water. Keep in the middle of the passage, or pass nearer the island than the shore; for a small shoal, named the Asno, lies there, the marks for which are the N.N.W. part of Old Corromeiro in one with the S.E. part of the Great Lobeira, and Point Galera on with the low shore of Fernelo. There is also another shoal running to the westward from Los Bueyes de Jures, or the Oxen, which are situated between the Asno and Point Galera, distant from the latter about half a mile, and from the former, rather more than one-tenth of a mile. The Oxen are three rocks above water, placed triangularly, and appearing similar to three boats, with deep water round them, except to the westward, as mentioned before. Vessels may pass between these rocks and the eastern shore, or between them and the Asno Point or Galera; the last channel is narrow, but with from 9 to 13 fathoms water. Let your best anchor be to the southward.

Sailing in with the wind at the N.W., the fairest passage will be between Cape Cé and the Little Corromeiro; keep near the latter, and on rounding it, haul up for the bay as close as you can; but if the wind should prevent you going in, anchor, take advantage of the tide, and get into a proper berth when convenient.

With the wind from the N.E., a good sailing-vessel should tack about the mouth of the bay, and there anchor; but if prevented doing this, run for the anchorage at Costeira, or abreast of Cravia, and there wait for a more favourable wind.

To the southward of Corcubion there is a small bay named Lezara, situated under a mountain of the same name, which runs in to the eastward about one mile, and has a good depth of water in it. At the head of the bay is a flat shore and a small river, which descends through a gully in the middle of the mountain, and supplies vessels with good fresh water. A short distance to the southward of this place, is a small cove with a flat beach, at the bottom of a deep valley, and the small fishing village of Pindo; and a mile further to the southward is the Beach of Crava, abreast of which is the best berth for vessels, when the wind is unfavourable for them to go to Corcubion. The coast between these places is rocky, and of a considerable height.

At the distance of $4\frac{1}{2}$ miles, S. $\frac{1}{4}$ E., of Cape Cé, on the western shore of Corcubion Inlet, is Caldebarcos Point, which is low and rocky, and has a rocky ledge running about half a mile to the southward of it. At this point the land bends inward towards the east, and runs for about 3 miles to Point Remedios, forming a small bay in which are $4\frac{1}{2}$ to 14 fathoms. Point Remedios is low and rocky some distance off, a dangerous ledge running towards the N.E. a distance of one mile, and there are other dangerous rocks a little to the westward of the point, leaving a small channel between them and the shore, safe only for small craft.

About $1\frac{1}{2}$ mile, N. $\frac{1}{4}$ W., from the extremity of Point Remedios, are some dangerous rocky patches; and 3 miles, N.N.W., from the same point, with Caldebarcos Point bearing E. by S., and Cape Finnisterre N.N.W., $4\frac{1}{2}$ miles, is a dangerous patch of $2\frac{1}{2}$ fathoms, named the Duyo Rock. It is of small

extent, but has deep water close to it on all sides, there being at a short distance from it from 10 to 20 fathoms.

Over Point Remedios there is a small conical hill, and at a quarter of a mile farther eastward there is another of the same shape, but larger. At about 3 miles, S. $\frac{1}{4}$ E., of the point is Point Lens, the land being low along the shore, and lined with rocks, but rising higher in the interior. Point Lens is cliffy and has a reef before it, and several sunken rocks upon which the sea breaks at low water. From hence the coast bends inwards, a short distance, and then turns to the southward, forming Point Louro, a lofty hill, high and round, and separated into two points or peaks, which at a distance appear like an island. On the southern and highest peak is a watch-tower. This point is easily known, and forms the north point of the Bay of Muros.

About 5 miles N.W. $\frac{1}{4}$ W. of Point Louro, and 3 miles W.S.W. of Point Remedios, is a cluster of rocks and shallow ledges, named the Ynsua, which are very dangerous, there being deep water close to all round, but as the sea generally breaks over them, their situation and position will be observed. There is a good channel between them and the shore, but when running outside of them, the Navé of Finisterre should be brought open a little to the westward of the cape, as you will then clear them to the westward.

Nearly 3 miles, W.N.W. $\frac{1}{4}$ W., from Mount Louro is a cluster of rocks named the Bryos, so low that the sea frequently dashes over them. Mount Louro itself has some rocks off its point named the Leixones, and between them and the shore there is said to be a narrow channel, but too dangerous to be attempted without a pilot.

THE BAY OF MUROS may readily be known by the appearance of Mount Louro; but if this hill should not be visible, you will to the northward perceive Cape Finisterre or Mount Lezara, or to the southward, the hill of Curota, the highest of any at this part.

To enter the bay with the wind from the northward, you must run under Mount Louro, leaving the Leixones Rocks on the port side, and giving a good berth to a reef that stretches from a point above it. Should the wind not allow you to stand directly towards Muros, you may with a tack or two get abreast of the town, and there anchor in 8 or 10 fathoms, muddy bottom, mooring north and south, as the on-shore wind, although from the eastward, raises a heavy sea, and has occasioned the loss of many vessels.

If coming in with winds from South to S.E., run along by the Baya Rocks, opposite Point Castro, but avoid bringing Misericordia Chapel in one with Point Cabeiro; then, after passing the rocks, anchor where you please, coming not too near the shores; you will have 10, 11, and 12 fathoms, soft muddy ground.

The bay is, for the most part, surrounded with high lands. If bound to Noya, at the head of it, a pilot will be requisite, there being several dangerous shallows in the way.

From the Punta de Castro and the Atalaya of Son, on the eastern side, are two dangerous ledges, the latter extending a mile from the shore. The Atalaya of Son is a point of moderate height, dark coloured, and precipitous, having a chapel on its summit. Close to it, on the east side, is the town of Son, with a pier for the protection of fishing-barks, &c. The Point Castro is also of moderate height, perpendicular, and dark-coloured, but cannot readily be distinguished from the high land at the back of it.

About 1 $\frac{1}{4}$ mile to the westward of Point Castro is a small ledge of rocks named Baya, which is nearly uncovered at low water, and has a narrow channel between it and the shore with deep water, but which can be used only by *small vessels*. At the same distance to the southward of Castro Point is

Roncadora Point, the shore between them being flat, with several large rocks and shoals. Roncadora Point is high and steep, and has some rocks about it.

About half a mile to the southward of Roncadora Point is Lago Point, and nearly the same distance farther on is Sierra Point, the shore being bold all the way, but lower than the preceding. Behind Sierra Point is the river of the same name.

At the distance of $2\frac{1}{4}$ miles to the S.W. of Sierra Point is Caresinas Point, which is low and rocky, and has some dangerous rocks lying off it some distance. The shore between these points is low, and lined with a sandy flat.

At 2 miles N.N.W. of Point Caresinas, is an extensive rocky bank named Las Basonas, the greater part of which is under water; but one rock of the group is generally above water, and has somewhat the appearance of a sloop's hull. Near this group of rocks there is a depth of 5 fathoms, increasing to 9 and 11 fathoms on the eastern side, until you come close to the shore; and between it and the Baya Rocks are 23 to 27 fathoms.

From Point Caresinas to Point Espineiria the distance is about $1\frac{1}{4}$ mile in a south-westerly direction, the shore between being low and flat. This point is moderately high, and has a reef extending from it to the northward about half a mile. There is also a rock named Teilan, about the same distance from the point in a W. by N. direction, being separated from the shore by a depth of 9 fathoms.

Between these two points, a little inland, there is a hill of moderate height, terminating in a point named Mount Taume, which slopes towards the S.W., and terminates in another small hill, of less elevation and pointedness, named Mount Facho.

About $1\frac{1}{4}$ mile to the south-west of Point Espineiria is Cape Corrobedo, which is low and projecting, and surrounded with rocks. Behind the point is the village of the same name. From hence the shore is low and flat, trending to the south-eastward to Falcoeiro Point, a distance of nearly 4 miles, and forming a small bay, in which the coasting-vessels occasionally anchor in 11 fathoms, sandy bottom. Off the entrance of this bay there are several rocks and dangerous ledges, with deep water close to them, the outermost of which is about 3 miles from the shore, and the sea generally breaks on them when there is a swell.

Falcoeiro Point is cliffy, and around it are some small islands and rocks, which at a distance have somewhat the appearance of a fleet of ships. The southernmost of these islands is Salbora Island, which is on the northern side of the entrance to Arosa Bay. It is about $1\frac{1}{4}$ mile in length, and is high in the middle but low at each end, and has a reddish colour, with some rocks extending from it towards the northern shore. On the east and north-east sides of the island are several large rocks, and off the south end is one at the distance of $1\frac{1}{4}$ cable's length, which is seldom seen above the water, and has breakers around it.

THE BAY OF AROSA, within the Isle Salbora, is extensive and affords anchorage, but its shores are generally shoal and rocky, and so many reefs line the coast as well as impede the navigation, that it has been described as too rocky and dangerous to be attempted by any who are not acquainted with it; to which has been added, that even small vessels fishing here have been frequently lost. It however appears from the chart of Don J. F. Florez, of the Spanish Navy, that the passage into the bay on the east of the Island Salbora, is two miles in breadth, and has a depth of 22 to 34 fathoms, which depth continues, 5 miles to the N.E. So that in case of emergency, a vessel may safely take the harbour, and lie sheltered therein, with the eastern end of Salbora bearing S.W. $\frac{1}{4}$ W., 5 miles, and the elevated church of Santa

Eugenia N.W. by W., $3\frac{1}{4}$ miles ; depth 25 and 26 fathoms. At the Island of Arosa, in the middle of this bay, the time of high water, on the full and change, is 3h. 45m. The tide flows five and ebbs seven hours.

Two miles to the eastward of Salbora Island is Grobe Peninsula, which is connected to the shore by a narrow neck of very low land, and 3 miles farther to the southward is the Island of Ons, which is about 3 miles in length from N.E. to S.W., of moderate height, and level on the top, but rugged on the western side, and bordered with rocks. Between the north end of the island and the shore is a wide channel, but rendered dangerous by several small rocky patches, and a rocky ledge extending from Corbeiro Point. Vessels can pass either between the shore and the rocky patches, or the patches and the north end of the island, as there is deep water of from 6 to 9 fathoms, rocky bottom, but the passage is not recommended, as it becomes very difficult in stormy weather.

A little to the southward of Ons Island is a small islet named Onza, of equal height with the former, and with a small beach on the N.E. side. The island is lined with rocks on all sides, and in the narrow strait between it and Ons there is a reef, with so little water on it, as to allow only small fishing-vessels to pass through. To the S.W. of the islet, at about three-quarters of a mile off, there is a rocky reef upon which the sea breaks, and about the same distance, in nearly a similar direction, there is another small rock which breaks occasionally.

PONTEVEDRA BAY is within the Islands of Ons and Onza. The south point of the bay is Cape Udra, which is low at the extremity, but soon rises to a hill of moderate elevation, having high land beyond, in the interior of the country. Around this point are numerous rocks upon which the sea breaks. The north point of the bay is named Point Cabicastro, and between these points there is a fair channel, 2 miles in breadth, although there are generally rocks off the projecting points on both sides of the harbour. The land on both sides is very lofty, containing many vallies of a very agreeable appearance, being well cultivated; and the soundings all over the bay are from 5 to 22 fathoms, bottom of mud and sand, excepting in the neighbourhood of Cape Udra, where it is of stone and gravel, and about Point Festinanzo, where it is stony: vessels will therefore avoid anchoring in those situations.

The Bay of Pontevedra is not difficult of access, but no heavy ship should come into it in winter, as it is so little sheltered. In summer the anchorages are good, except where the bottom is rocky. Should the winter be northerly, you may run through the channel, already described, between the Island Ons and Point Corbeiro; but if you sail into the southward of Ons, steer about a quarter of a mile from the little Island of Onza, which lies at the south end of Ons.

In approaching from sea, the bay may be easily known by the Mountain Curota, the Islands Ons and Onza, the Island Salbora to the northward, and the Cies or Bayonna Islands to the southward; all these contribute to prevent the probability of a mistake. The course in, from between Point Udra and Point Cabricastro, is E.S.E. until the Isla of Tamba, which will be seen at the upper part of the haven, appears midway between the two coasts, whence the course up to the south end of that island will be E. by N., 4 miles. Within the Isle of Tamba is the road or anchorage of Pontevedra, the river being dry at low water; its depths are from 8 to 2 fathoms, bottom of mud. The Town of Pontevedra is one of the principal towns of Galicia; it is two miles up the river, and at the entrance of it, even coasters must wait till the flow of tide to carry them up to the town. High water at full and change, at 4h 0m.

From Point Udra the coast runs southerly towards the Bay of Aldan,

having a stream of excellent water at the town of that name, in the bottom of the bay. But the east side of this place is studded with rocks and shoals so much, that no vessels should even venture to bring Udra Point as far as N.N.E. The Harbour of Aldan is of good depth, and clean sandy bottom, and can accommodate ships of every description, there being at its entrance from 15 to 17 fathoms water, decreasing as you advance into it. It is advisable to moor E.N.E. and W.S.W., because the winds from the N.N.W. are dangerous, and bring in a swell of the sea. To sail into this bay you should have a leading wind, and then keep in mid-channel, standing on for Point Con, and leaving the Bouteye Shoal to the starboard, run up to the low shore of Arnela, within two cables' length of which is the anchorage. Point Cousa is the southern point of the Harbour of Aldan; it is high and steep, having a shoal to the northward. Hence to Cape Hombre the coast bends to the S.W. by S., a distance of $3\frac{1}{2}$ miles, the shore all the way being high, steep, and clean, excepting close to the land, where there are a few rocks. A short distance from Cape Hombre is Point Subrido, which is of moderate height and steep, and has a small reef extending from it. These points bound Vigo Bay on the north side.

VIGO is easily known by the Bayonna Islands before it; but these will appear, from sea, as part of the main land; in which case you will see the Mountain Curota to the northward, and Na. Sa. del Alba to the southward; besides which, no opening will appear in the coast all the way from Cape Silleyro to the River Minho, the land being high and level throughout. This is considered to be one of the largest, deepest, and best harbours in Spain; the town, which is on the southern side of the bay, is surrounded by a wall, and defended by a citadel and castle; it is the general resort of coasting and other trading-vessels, and has many barques and fishing-vessels belonging to it.

At about $1\frac{1}{2}$ mile to the north-eastward of the town, there is a light in the Castle of la Guia, which revolves every 3 minutes, at an elevation of 102 feet above the level of high water, and is visible 7 miles.

The Bayonna Islands before the inlet are uninhabited, high, and uneven on the summit, very steep on the west side, but less so on the east. The north point of the northern isle is named Point Caballo, and off it, at the distance of a quarter of a mile, N.N.W., is the Roncosa Shoal, which appears at low water above the surface. At half a league, N. 5° W. (by compass), from the same point is the Biduido Rock, having $3\frac{1}{2}$ fathoms over it at low water, being steep-to on the north side, and having on the south from 6 to 7 fathoms, increasing to 15 at a short distance. The S.E. end of the southern isle is named Cape Bicos, and from it W.S.W., at two-thirds of a mile, is Boiero Islet, which, in a heavy sea, is washed over by the waves. This islet is surrounded by smaller rocks.



Bayonna Islands, Point A bearing S. 31° E. (true), distant 6 miles.

Between these islands there is a small channel, the mark to sail through which is the north end of the southern island in one with the chapel Na. Sa. del Alba, and when you have thus entered the channel, run midway through

it, right up the bay. In Vigo Bay good water may be obtained, but the supply of wood is scanty.

About $4\frac{1}{2}$ miles to the S.S.W. of Cape Bicos, the south-eastern extremity of the southern Bayonna Island, is Cape Silleyro, which is high and rugged, having at its base a low point, which terminates in a ledge of rocks, extending a quarter of a mile to the N.N.W.; part of this ledge may be seen at low water, but, during a swell, the sea breaks over it. The channel between these points is named the Southern Pass of Vigo.

Vigo Bay is entirely enclosed with high mountainous land; but its most remarkable object, at a distance, is a sharp-pointed hill, on the south side, having on it the chapel of Na. Sa. del Alba, which may be seen at a great distance, and to those bound hither, a knowledge of it is of great importance. Within the South Pass of Vigo, the first point on the east is Cape Estella, which is black, having a reef stretching from it to the distance of two cables' length to the N.N.W. To the north-eastward of the cape is the little Island Torallo, which is equal to the point in height, and at a distance appears to be a part of it.

Within Cape Estella, $2\frac{1}{2}$ miles, is Cape de Mar, which is low, and of a sandy colour. It projects considerably into the sea, and constitutes a principal mark for leading into the harbour. Without it, to the distance of two cables' length, a reef extends, part of which is visible at low water, but the whole is covered with a flood, and the sea, with a swell, breaks over it. Opposite to Cape de Mar, on the north side, is Borneyra Point, low at the extremity, but rising northward to a considerable height; its reefs, with rocks above water, extend out to the distance of nearly half a mile.

The beach of Vigo is clean, and there is a good depth before it, wherein is the usual anchorage, in from 13 to 8 fathoms, mud. It is usual to moor with the best anchor to the North, and the other South, as a ship will lie thus well sheltered from the sea on the west by the Bayonna Islands. It is, however, said that off the village of Seis, about two miles higher, they may be safer; as they here make fast a cable on shore, and carry out an anchor to the northward, when lying in 6 fathoms. To the eastward of Randa Point, which is two miles above the Road of Seis, many vessels may anchor, in from 15 to 6 fathoms, bottom of mud, in safety from all winds; and above this part, vessels coming in without anchors or cables, may run aground anywhere on the mud, until necessities can be procured, when they may be lightened and got off safely.

If desirous of reaching Vigo by the Northern Passage, which is the best when the wind comes from the northward, steer under the south shore of Onza Island, within the distance of from one to three miles, but not farther; then stand to the eastward until you have Monte Ferro quite open to the east of Point Caballo (the north end of the Bayonna Islands), with the hill of Na. Sa. del Alba quite hidden by Cape del Hombre, when you will be clear of the Biduido Rock, and may round Point Subrido, giving the land a berth of at least a cable's length; next steer for Cape de Mar, until you gain the middle of the bay, whence you make for the Town of Vigo. Care must, however, be taken, not to bring Points Subrido and Caballo in one, until the Church of Cangas, on the north coast, be open, when you clear the reefs of Borneyra. In case of a change of wind, be cautious not to approach either shore nearer than 8 fathoms. Without the reefs, the ground of the bay is, in general, of mud and sand.

To sail into Vigo Bay by the Southern Passage, you should bring Cape de Mar (known by its sandy colour) in a line with the Chapel of Na. Sa. de Guia, to the north-eastward of Vigo. This mark will lead through in mid-channel,

THE NORTHERN COAST OF SPAIN.

in from 32 to 27 fathoms, until Monte Ferro bears S.S.W. when you must steer more northerly, for the channel between the reefs of Borneyra and those of Cape de Mar; taking care, as before directed, not to bring Subrido and Caballo Points in one until the Church of Cangas be open. Hence you proceed to the town.

Should adverse winds oblige you to turn in through the South Channel, take care to avoid the shoal of Laxes, and the dangerous rocks of Boeiro, having passed which you may proceed as you please.

It should be mentioned that Captain Sir Thomas Maitland, of H.M.S. *America*, struck on a pinnacle-pointed rock in 1847, lying about two-thirds of a mile S.S.W. (true) from the centre of the Boeiro Rocks, off the south end of the Bayonna Islands. The head pilot of Vigo was on board at the time, and was quite ignorant of the existence of such a danger. The vessel drew 20 feet, and close to it at the time of striking were 15 fathoms.

The following observations upon Vigo Bay have been extracted from the *Nautical Magazine*, 1840, page 686.

“To enter Vigo by the North Channel, pass near the Island of Onza; steer S. by E. or S.S.E., according to your distance from it, till you bring Mount Ferro quite open in the passage between the island and the main; the Mount will then bear South a little westerly, and is a black round hill on the south side of the bay. Steer for it, and when in the passage edge over to Cape del Hombre and Subrido Point, giving them a moderate berth. When Cape de Mar comes well open of Subrido Point, bearing S.E., steer S.E. by E. This is a point only to be made out by being one with the only low sandy patches in that direction. Steering about this course $8\frac{1}{4}$ miles, keeping the sea open astern of you, between Subrido and the islands, if on approaching Cape de Mar, the sea is only just kept open, you will be in the right channel and clear of the rocks, which run out from Cape de Mar: this is useful to observe in the night, as it insures you being clear of the dangers on both sides; you will open Cangas Church clear of Point Fanequira, when you are clear of the shoals off it, and you may steer for the Chapel of Na. Sa. de la Guia, which will bear East, and which course will lead you right up to abreast of the Town of Vigo, where you may anchor in 5 fathoms very near the shore. This Chapel of Na. Sa. de la Guia, is not readily recognised by a stranger. It is a very small white-washed building, upon a hill apparently half the height of those beyond it, and is the next projecting land beyond Vigo, but it is of little consequence the finding it out; steering just clear of Vigo Town, or East will answer equally well.

“Leaving Vigo, steer for the middle of the south Bayonna Island, about West; if for the North Channel, take care not to lose sight of Cangas Church before you open the sea. When Cape de Mar is passed, if for the South Channel, a course between W.S.W. and W. by S., according to the distance at which you pass Cape de Mar, will carry you right out to sea; distance 10 miles from Vigo Town,—the distance from sea in the North Channel being $7\frac{1}{4}$ miles. High water in the bay, full and change, at 3h.; there appears to be only a very moderate rise and fall, the tide scarcely perceptible.

THE SOUTH CHANNEL.—“The marks given for this channel by Tofino are frequently very bad to make out, and in thick weather cannot be seen at all. Therefore, as the rocks on the starboard hand are always plainly to be seen, adopt a course more in mid-channel, which pilots do, and then steer E.N.E. In the South Channel to, it is well to observe, that if immediately after passing Boeiro Rocks, you should haul up for Cape Bicos, and which running in, in very bad weather, it is probable would be done if near night, to anchor under the islands. Some rocks, which only show themselves at low water, and

which are not noticed in the charts, would be passed very close indeed. For entering the South Channel at night, an observation or two may be useful. Pass Cape Silleyro (coming from the south is here understood) at a moderate distance; steer N. by E. until you get Cape Bicos (of the south island) in such a position, that by shaping a course N.E. by E., you have it a little open on the port bow; this course will take you safe into the middle of the bay. If coming in from seaward, bring the south end of the island to bear E.S.E., steer for it, and then you will not fail to make Boeiro Rocks, which you will then round at any convenient distance, and you have your exact position."

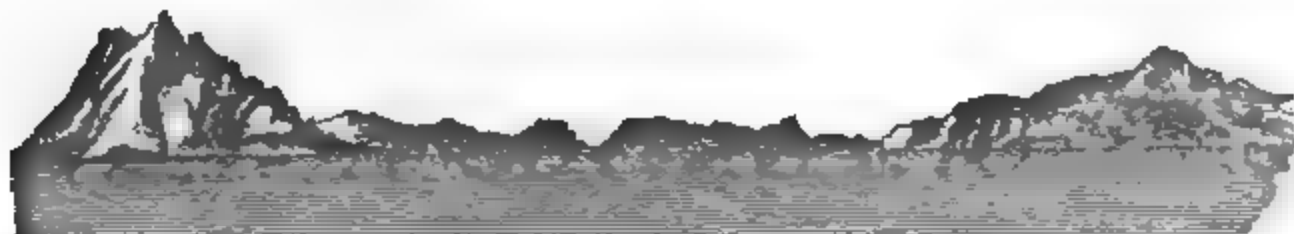
The Harbour of Bayonna lies on the southern side of Vigo Bay, and behind the Isles of Estella: it is small and filled with shoals. You will find shelter to the S.E. of Point Tenaza. This place should not be attempted without a pilot.

From Point Tenaza the coast runs southerly to Cape Silleyro, all steep-to and foul; the cape is high and rugged, but its summit is nearly level; from it runs out a ledge of rocks N.N.W., a quarter of a mile, over which the sea breaks. To the eastward, on an eminence, is the Chapel of Na. Sa. de Zela. From the breakers of Cape Silleyro the coast runs S. by W. $\frac{1}{4}$ W to Point Montador, which has some rocks before it, and to the southward is the Town of Oyo and a battery; three leagues from the same breakers is the Hill of La Guardia, having a small town and creek at its foot, used chiefly by fishermen. To the S.S.W. the land is lower, until you reach the sugar-loaf hill of St. Rego, having two peaks, on the highest of which is the Chapel of St. Tecla, which serves to point out the situation of the River Minho, the boundary of the kingdoms of Spain and Portugal.

THE COAST OF PORTUGAL.

FROM THE RIVER MINHO TO THE RIVER GUADIANA.

THE RIVER MINHO OR MINIO is shoal and must only be taken with an experienced pilot; at the entrance is a low island, which forms two small channels, the depth of the best being only 10 feet at high water. The river is navigable, but it has several shoals and shifting banks. On its southern bank is the small Town of Caminha.



Entrance to the River Minho, the Castle (A) bearing N. 41° (true), 2 leagues.

From Mount Tecla to Cape Viana the coast runs in a southerly direction, about 12 miles, being throughout of a moderate height, but rising behind to a range of mountains, higher than those to the northward, and visible 16 or 18 leagues off, forming a good object to know this part by, when coming from sea. Cape Viana is the north point of the River Lima; Cape Nivos being its

southern point. The town has a white appearance, and stands on the north side of the river. From Cape Viana a reef runs out southerly. When about to anchor, bring the town to bear E.N.E., but to enter the river you should have a pilot, for the bar is both shallow and dangerous. Here a low shore begins, extending southerly a full league; it then becomes somewhat higher and even, but lined within by ranges of hills named the Fons Mountain, which extend as far as Villa del Conde. Here some white buildings mark the entrance to the river, where the town stands. Within this space are the towns of Espozende and Fao; between which runs a small river, with about 6 or 7 feet water. Opposite the Town of Fao are two ledges of rocks, running out $1\frac{1}{2}$ mile, even with the water's edge, named Caballos; come not closer to the shore in passing than 14 fathoms; but if to the southward of them, you may lessen your water to 9 and 8 fathoms.



Fons Mountain, Point A bearing N. 80° E. (true), distant 15 miles.

From the Town of Espozende to Villa del Conde the coast runs southerly a distance of $11\frac{1}{2}$ miles. A little to the eastward of the last mentioned town is situated the Convent of Sta. Clara, which is surrounded by houses and has the appearance of a small township: attached to this convent is an extensive aqueduct, running along parallel to the coast. Opposite the convent, and upon the left bank of the River Ave, is the village of Azurara, with a lofty steeple. These will, in a great measure, serve to point out the situation of Villa del Conde, as they can be seen from sea at a considerable distance.

Villa del Conde is a bar haven, and has several rocks scattered about its entrance; but ships may sail among them on every side; the narrowest channel is on the northern side, having 5 or 6 fathoms water. Farther in is a bank crossing the haven, with only two fathoms upon it at high water; but within this bar the haven is 3 and 4 fathoms deep. The north side is filled with rocks under water, but on the southern side are 5 and 6 fathoms, and round the mouth of the river are 9 and 10 fathoms. A pilot will always be found necessary for this haven, as like all others on this coast, it is subject to very extensive changes after a continuance of bad weather.

At $3\frac{1}{2}$ miles off the mouth of the Ave is a dangerous rock, upon which Captain Glascock, of H.M.S. Orestes, has made the following remarks:—"At 6h. 15m. P.M., when in stays, and hauling the yards, the ship struck the ground twice in a few seconds, with the north part of the village of Villa del Conde bearing E. $\frac{1}{2}$ N.; south part of ditto, E. $\frac{1}{2}$ S.; off-shore 3 miles and a half. This bank is steep-to; as at one cable's length no bottom could be obtained with the hand line. To avoid this shoal, ships in the neighbourhood of Villa del Conde should not approach the shore nearer than $4\frac{1}{2}$ or 5 miles."

From Villa del Conde the coast runs southerly, a distance of 10 miles, to the rocks named Leichoes, being almost entirely low land with a flat shore, but rising in the interior to small chains of hills. In the way there are numerous rocks and dangerous patches, situated pretty close to the land, and which are principally above the surface when the tide is down, rendering precaution necessary when running along the coast.

Opposite the small river Leça, upon the banks of which are built, the one

opposite to the other, the two small towns of Lega and Matozinhos, are the rocks named Leichoes, which are always uncovered, and have a form similar to the segment of a circle. These rocks are distant from the land about one mile, and within them is shelter from northerly and north-westerly winds, in soundings of 6 and 7 fathoms. At the distance of half a mile to the E.S.E. of the most southerly rock is a small bank of 11 feet, upon which the waves break with so much violence, that small vessels approaching it in bad weather run the risk of being overturned. This shoal is exactly a quarter of a mile from the coast, and is situated nearly West (*true*) from the Chapel of Sr J. de Aréa, which is built upon the shore, and has near it a well of excellent water. At the distance of nearly half a mile to the eastward of this chapel is the Chapel of Sr J. de Boucas or Matozinhos, situated in the middle of a grove of poplar trees, which, although a large building, cannot be seen at any considerable distance.

In the North Channel, formed by the Leichoes Rocks and the land, is water deep enough for every description of vessels, and good anchorage in 6 to 9 fathoms. It is perhaps the only shelter on this part of the coast for vessels meeting with contrary winds, and the only place where vessels reduced to the necessity of running themselves ashore can do so in safety. The vessels of the pilots and fishermen can almost always gain the sea from this anchorage, when it would be impossible for them to do so from any other part. From these rocks to Oporto, the distance is about $2\frac{1}{4}$ miles in a southerly direction.

OPORTO.—The mouth of the Douro, or River Oporto, lies $4\frac{1}{2}$ leagues to the southward of Villa del Conde. The shore between is in general low, but within is a range of hills of moderate height. The town of Oporto stands high, having a black steeple near its centre; and as you get near the land, the tower of Joao de Foz will be seen near the mouth of the river; also the chapel of Na. Sa. da Luz, and near it a lighthouse, where a light is exhibited every night, which revolves in 6 minutes, but it is not considered to be a very good light.

On the north point of the entrance is the Castle of St. Joao de Foz, from which extends a ledge of rocks to the S.W., some always above water. Without these is another ledge, Filgueirá, always visible, and to be left on the port hand when entering the river. The south point of the entrance, Cabadelo, is a low sandy point. Those advancing should previously ascertain their latitude, and know, that with south-westerly and north-westerly winds, a heavy sea sets in along the coast.

The bar of the Douro is liable to considerable change, occasioned by the sudden swellings of the river, termed freshes, and from the heavy westerly gales to which it is exposed. The freshes most frequently take place in the spring of the year, and proceed from the melting of the snow on the mountains of Spain. The rise of the water in the river, at these times, is frequently as much as 40 feet, and the rapidity of the stream is so great, as to break vessels adrift from their moorings, and occasion their total loss, it being impossible to afford them the smallest assistance. As no dependance can be placed on the anchors, in these times of danger, precautions are generally taken by the masters of vessels, to secure the end of a cable to trees on the bank of the river, or to stone pillars, which have been provided for the purpose. They have ample time for preparation, as the approach of one of these freshes is communicated from the interior several days before its arrival; *during which time the river gradually swells and attains its greatest height.* The ordinary rise of neap tides is from 6 to 8 feet, and that of springs from 10 to 12 feet.

The bar being liable to alterations, &c., as before-mentioned, renders it absolutely necessary to employ a pilot. The pilots are generally fishermen of the port, who are always ready to go off when a vessel comes in sight, unless the weather prevents their getting out, or if it be so thick that they cannot discern the marks, the land being low and level. You first enter with the Chapel of St. Catherine in a line with that of St. Miguel, or St. Michael, which leads over the bar, and thence proceed according to circumstances.

The following observations on the bar and harbour of Oporto, are extracted from the *Nautical Magazine*, 1832, page 507 :—

“ The first precaution to be observed by vessels bound to Oporto, is to be certain of their latitude, as there is a great sameness in the appearance of the land, and the towns to the northward of Oporto are seen at a great distance. Oporto may be known with the assistance of the latitude, by its being situated about 3 miles inland, and partly built on a small eminence, with the black steeple of Torre dos Clerigos in the middle, and Foz before it on the sea shore. No vessel should attempt the bar without a pilot, as it is constantly shifting, and the freshes render it extremely dangerous. Mr. Charles Gahan, the second master of H.M. brig *Royalist*, informs us that vessels are frequently prevented from entering the river for three or four weeks at a time. In addition to which, Mr. H. J. Strutt, the master of H.M.S. *Victor*, commanded by Captain Ellice, says, that no vessel drawing more than 15½ feet of water can pass it at any time.

“ On the extraordinary and dangerous freshes to which the River Douro is subject, Mr. Strutt makes the following useful observations :—‘ It is, perhaps, superfluous to observe, that the great extent of the river, the steepness of its banks, narrow bed, and debouchure, as also the number of streams tributary to it, make it liable to considerable irregularity in rise and strength of current. Now, the seasons here are tolerably regular ; the rains are heavy, continuous, and general. Thus the river is occasionally swollen above its customary level. Again, during the prevalence of W. and S.W. winds, to which its entrance and principal direction is exposed, its stream is more or less impeded, as those winds cause an accumulation of sand along the shore to seaward, and upon the rocks, which are the fundamental basis of the bar. Thus arises its liability to “ freshes ” ; the strength, duration, and importance, depending upon the conjoined operation of some or all of these causes. The periodical fall of the stream being overcome, and a gradual rise continuing for two or three days, is a certain indication of one being at hand ; and, when the waters begin to find vent, before the commencement of the run is perceptible, the middle of the river is covered with rubbish, patches of foam, &c. The *Victor* experienced one, accompanied with about ten days’ rain, with little intermission, and those chiefly drizzling. During that time the wind was westerly, but neither very strong nor steady. The first indication, viz. loss of tide, was observed two days before the rubbish and foam was observed ; the day following it attained full strength, and subsided on the third morning afterwards to the usual strength of current. We had 4½ knots alongside ; in the middle of the stream it was of twice that velocity. There can be little doubt that the strength of this fresh is very often much exceeded, especially in the spring of the year, when on a sudden thaw on the mountainous tracts, which border the river, occasions the descent of a great body of water. At all events, the utmost precaution for holding the vessel is indispensable ; for the bottom is of light soil, soft, but not tenacious, and appears to be considerably agitated ; and, strange as it may be thought, two vessels on the opposite shore had their bows in the stream washed astern, a circumstance which is stated to be not uncommon at such times, owing to the rapidity of the stream.’

“ The following precautions, adopted by the *Victor*, may be useful to vessels. The anchorage taken up by this vessel was about a mile to the west of San Joao de Foz, in 13 fathoms of water.

“ ‘Aug. 12, 1832.—Having had much rain, and missing the accustomed fall of the river, completed preparations for a fresh, having the small bower with 65 fathoms of chain in the stream, on port bow, the best bower buried on shore with a chain, and a hempen cable clenched round a tree, on starboard bow. Stream anchor, with 50 fathoms of chain, on port quarter (in the stream); stream hemp, and a 4½ inch hawser on starboard quarter, to the shore; with spare messenger, and a warp for breast-fast. The vessel warped into little more than her own draught, with the rise of the water.’

“ We will now give Mr. Gahan’s directions for the guidance of vessels in the Douro :—

“ ‘During the summer months the best anchorage is off the city, fifty fathoms below the rocks which show at half-tide; there being no other rocks near this place, it cannot be mistaken. Moor head and stern, your small bower anchor ahead, and stream astern; hove as close as possible to the south shore, by a head and stern hawser made fast to the shore. But on the least indication of a fresh, such as having a continuance of heavy rain, or a fall of snow on the mountains (more particularly the latter, when thawing), you must immediately move below St. Antonio de Val de Piedade Convent. The following are the marks for anchoring :—Sarra Convent, which is situated on a hill above the bridge just open of St. Antonio Point, which is a short distance outside of St. Antonio de Val de Piedade Convent, bearing S.E. ¼ E. (by compass); old burying ground point N.W. ¾ N.; a large yellow house in a valley among some trees on the south side, S. by W. With these bearings and marks on, you will be in 20 feet of water, low water, spring tides. The ship’s head being S.E., the small bower anchor is to be let go in 50 fathoms, one point on the port bow; the stream in 70 fathoms, one point on the port quarter; the best bower cable to be made fast to the bower anchor, which must be taken on shore, and buried in the quay three points on the starboard bow; a hawser from the starboard quarter to the shore, and a good hawser or stream cable, from the starboard bow to the shore, to heave in-shore by; all cables to be hove well taut; particular attention should be paid to the rise and fall of tide, taking care to heave in-shore immediately the water rises, and remains above high water mark, as there is scarcely any ebb for one or two days previous to a fresh. Every precaution should be taken to prevent the vessel sheering as you heave, in keeping booms ready to boom off from the shore; a strict look-out should be kept, to ascertain when the water begins to fall, taking care to heave off as the water falls. After a heavy fresh it would be advisable to sight your anchors, or, in all probability, you will lose them. The rise of water in a heavy fresh is 20 feet above high water mark; the general rise and fall of the river, as far up as the town, is 12 feet.’ ”

From Oporto the coast runs southerly, a distance of 30 miles, to the bar of Aveiro. Immediately to the southward of Oporto it bends a little easterly, forming a small bay. Almost all the coast throughout this extent is flat and stony, but rises in some places to a moderate height. From the first fishermen’s huts, named the Espinhos, to Cape Mondego, near Figueria, the coast maintains the same appearance, but here and there are a few thatched cottages, amongst which is a building named Casa-Branca (White House), situated about 6 miles to the south of Espinhos. At the Bar of the *Douro*, the land begins to rise in the interior, reaching to the Heights of *Ovar*, and forms a kind of peak named Ornellas, which is visible to a considerable distance; this peak is named by seamen the Altos da Feira, and by

the inhabitants of the district the Outeiro de Carregoza, and is situated in lat. $40^{\circ} 50'$ and long. $8^{\circ} 20' 43''$. The City and Fort of Feira, situated upon elevated land forming part of this hill, are about 4 miles from the coast, and can be seen at a considerable distance. Here also you may see, even at the distance of 30 miles from the shore, the Peak of Ornellas, by which you may mark the neighbourhood of Oporto. This lofty mountain slopes towards the south, and, in a series of less elevated hills, unites itself to the great chain of mountains named Caramulo, which extends in a direction parallel to the coast: the Peak of Ornellas is almost in the centre of this chain, and will be seen in clear weather at about 20 miles to the westward of Aveiro, sloping gradually towards the south, and will prove an excellent object to know this part of the coast by.

It should be noticed, that the appearance of Caramulo is not unlike Ornellas, and it is necessary not to mistake them, although the great distance they are from each other, ought to make the error a matter of difficulty. This chain of mountains is almost perpendicular at the Rivers Douro and Mondego, and runs nearly north and south at the distance of 16 miles from the coast, leaving between it and the sea a vast fertile plain.

All the extent of this coast is very flat, but at 2 miles from the shore are 11 to 12 fathoms. It is occasionally very difficult to distinguish it, as fogs hover about the Caramulo Mountains in bad weather, thus concealing from view the only objects by which you may know it when far out at sea, if we except the small huts, of which mention has already been made. In bad weather and violent gales, and uncertain of a correct latitude, it would be imprudent to attempt to make the Bar of Aveiro, as it is not unfrequently concealed by fogs and sandy mists, raised by strong northerly gales.

AVEIRO.—In sailing from Oporto to this place there is no danger, as, at $1\frac{1}{2}$ mile distance from the shore, you will find 9 to 12 fathoms. The Bar of Aveiro, being composed entirely of sand, frequently changes, and no vessel can pass it unless conducted by a pilot. Two pyramids of stone serve to point out the entrance, as, if kept in a line, they will lead to the bar; they are more than 70 feet in height, have square bases, with bands traced horizontally, white and black, and may be distinguished at 9 miles off. There is said to be a lighthouse near the pyramids, which shows a revolving light, but of its existence we are uncertain.

The Hill of Cape Mondego is S.W. $\frac{1}{4}$ S., about 27 miles, from the entrance to Aveiro; its summit is flat, and at a distance has the appearance of an island; but be careful not to mistake it for the Berlings. The land, after you have passed the cape, bends to the eastward, and, with off-shore winds, good anchorage may be found, when the cape bears north, distant 5 or 6 miles, on a bottom of fine sand, or with the cape bearing N. by W., distant 4 or 5 miles; but should the wind get to the southward, you must weigh immediately, and stand out to sea, for westerly gales generally commence from the southward, and send in a heavy sea, and as these winds are frequently of long duration, and occasion many accidents, therefore, do not get into less than 18 or 20 fathoms, or to the northward of the cape in 35 fathoms, which will be above 5 leagues off, the soundings gradually decreasing towards the shore. Abreast of the cape are 7 fathoms; a little farther off, 20 fathoms; and at about 7 miles distance, 30 fathoms, brown sand and shells.

FIGUEIRA.—The bar of the River Mondego, lying about 4 miles to the S.E. of the cape, has only 12 feet over it at low water, and it frequently changes. The Town of Figueira stands on the north bank of the river, within the bar; it is defended by the Fort of Santa Catarina, upon which a signal-flag is displayed, to signify that vessels may enter the river. This flag is lowered or

struck, when the sea is so heavy that pilot-boats cannot go off, and likewise when the water is not sufficiently high for allowing vessels to enter the river. When a gun at the fort is fired, without hoisting the flag, it is a signal to vessels to keep their station, or prepare for entering; and when the flag is afterwards hoisted, it denotes that there is water for passing over the bar.

From Cape Mondego to the small Bay of Pederneira, the coast runs southerly a distance of 37 miles. The shore is flat, and is composed almost entirely of sand, but rises in the interior to hills of a moderate elevation. This level coast is covered here and there with woods of fir and larch trees, the most extensive of which are Leiria and Concelho, together occupying an extent of country amounting to 18 miles by $27\frac{1}{4}$ miles. These woods, which were originally planted to protect the cultivated lands in the interior from the moving sand-hills, are much cut for ship-building and other purposes, and employ a vast number of small craft, which generally anchor opposite Vieiria River, or near the Chapel of San Pedro de Muel, at a quarter of a mile from the coast, in 9 to 11 fathoms, upon a bottom of sand. But this situation is safe only in fine weather, and N.E. or easterly winds; as at the least appearance of winds from sea, or heavy gales, it becomes exceeding hazardous to stop here.

Upon this flat sandy shore there is nothing remarkable, except three sandy points situated between Cabedello and Vieiria River. The woods mentioned above are visible about 4 or 5 miles from the shore, from which they are separated by vast sandy plains, and when cut, they are transported on carts and other conveyances to the vessels.

The northern extremity of the small bay of Pederneira, is formed by a great rocky cliff, which rises to a considerable height above the flat sandy coast, and is almost perpendicular, advancing into the sea in a south-westerly direction. This rocky cliff or point is about a mile long, and 180 fathoms broad, and has upon its most projecting part a battery, which protects the bay. Upon its summit is the Church of Na. Sa. de Nazareth, with its lofty pointed spire, which is an excellent mark to know the coast by, especially as there is no other object in the vicinity with which it may be confounded. The position of this steeple is lat. $39^{\circ} 36' 6''$, and long. $9^{\circ} 2' 40''$, and it is surrounded by a number of houses, giving the place the appearance of a small hamlet. Upon the declivity towards the north-west, is a plantation of fir-trees, for the protection of the church and village from the wandering sand-hills.

The small vessels which anchor in the Bay of Pederneira lie sheltered from easterly winds, but are exposed to all other winds. The town is partly situated upon a hill, which is in a measure a branch of the Heights of Nazareth, and connected with the high land in the interior: the inhabitants are principally employed in fishing. About 6 miles to the southward of the Chapel Na. Sa. de Nazareth is the small Port or Bay of San Martinho, that affords a safe shelter to small vessels, which load wood from the forests of Leiria.

About 7 miles to the southward of San Martinho is the Lake of Obidos, the entrance to which is not unfrequently mistaken for that port. This lake is about 8 miles in extent, and is connected to the sea by a small river, which dries in summer. It abounds in excellent fish, giving constant employment to the inhabitants of the neighbourhood. The coast comprised between the Bay of Pederneira and the Lake of Obidos, is formed by the Boiro Hills, which are high, and rise perpendicularly: it ends in a point at the entrance *of the lake, which is named Faxo*, on account of some lights occasionally ex-

hibited for the use of the fishermen. Hence to Peniche the shore is composed of sand and sandy downs.

Cape Carvoeiro, or Peniche, is steep, and projects considerably to the westward, having a large rock before it, and a chapel on its summit. On it there is a lighthouse 94 feet high, which shows a fixed light at 182 feet above high water, visible 15 miles. On the east side of the cape is a tract of low flat land, which appears, as you sail along, to separate the cape from the main, giving it the appearance of an island; be careful of this appearance, for, in thick weather, vessels have been known to mistake it for the Borlings, and, advancing on this apparent opening, have run on shore and been lost.

BERLENGAS OR **BORLINGS** lie to the N.N.W. $\frac{1}{4}$ W. of Cape Carvoeiro. The greater isle, or Berlenga, is of moderate height, and level on the summit, but has a cleft or hollow about the middle of it; it is steep-to, excepting on the eastern side, where there is a small flat beach; on this side there is also a small fort, off which vessels may ride with N.W., W., and S.W. winds, in from 15 to 12 fathoms, sandy bottom; but if the wind is from any other quarter, this will not be found a safe place for anchorage. Plenty of fresh water may be obtained here.



The Berlengas Islands, distant about 5 miles.

On the S.E. side of this island has lately been erected a lighthouse, Cape Roca bearing S. 29° W.; east end of Great Faralhoen, North; and the top of the Great Estella Rock, N. $42\frac{1}{4}^{\circ}$ W. The tower is 75 feet high, and the lantern 25; the latter 365 feet above the level of the sea. The light revolves, and shows its brightest glare every 3 minutes, the glare lasting 12 seconds. The lighthouse is stated to be in lat. $39^{\circ} 25'$ N. and long. $9^{\circ} 31'$ W. of Greenwich, and the light may be seen 7 or 8 leagues off.

Near the west side of the great island is the high rocky islet of Farilhoen, with a cluster of small ones round it, named the Estellas, one of which is at the distance of one quarter of a mile. S.S.W. of that, distant one mile, lies a rock which appears at low water. On the north side of the great island is the Little Farilhoen, and about N.E. $\frac{1}{4}$ N., distant 5 miles, lies the Great Farilhoen, being a broad, round, ragged rock, with a number of smaller ones around it; it is nearly as high as the Burlings, and near it is another of similar size and height; a sunken rock is to the W.S.W. of it, at the distance of half a mile.

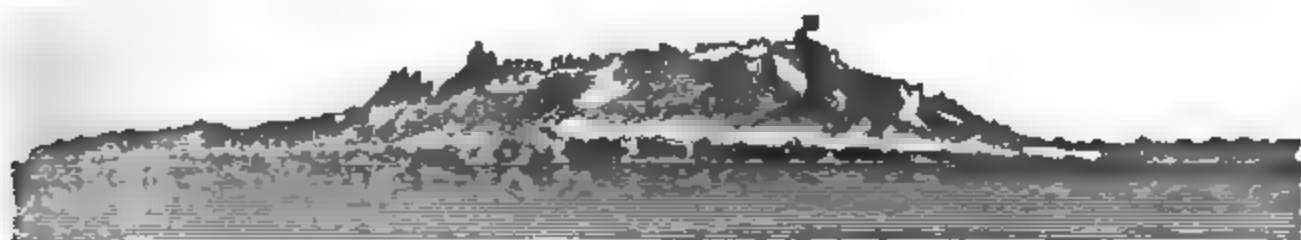
The channel between the Borlings and Cape Carvoeiro is nearly 6 miles wide, and clear of danger, with from 14 to 24 fathoms water, so that not only single ships, but whole fleets, can sail through it. Cape Carvoeiro cannot easily be mistaken for the Borlings, neither can the Borlings be mistaken for Cape Carvoeiro; for the Farilhoens (which may be seen when coming in with the Borlings) will strikingly mark the distinction between the cape and the islets.

It has been remarked by a correspondent of the *Nautical Magazine*, that "It is always safer to pass inside of the Borlings, unless (which will rarely happen) the weather is such as to create doubt about seeing them. They are better to make out when they are betwixt you and the sea horizon, than when on with the land, for this is often enveloped in a sort of haze, which prevails

all along this coast, to a degree its fine latitude would not lead one to expect. Attempting, therefore, to pass outside the Borlings, is to confound them with the land, unless very clear weather causes an uncertainty about the distance you are from them, and induces a greater berth to be given them, which increases the distance considerably. Soundings must be the principal guide in passing outside in thick weather. The course above recommended, will carry you right in mid-channel between Peniche and the Burlings, which passage is wide and free from dangers, with a general depth of from 32 to 14 fathoms.

East and North of Cape Carvoeiro, at the beginning of the low land, lies the upper town of Peniche, and on the east and south side of the cape is the lower town. There begins a flat bay, ending in a rocky point, on which stands the Castle of Anparo; in this little bay a vessel may anchor with the winds from the E.N.E. to the N.N.W., but not with any other. At 3 leagues to the southward is the Castle of Encarnacion, where an extensive flat beach begins. At 4 leagues from Encarnacion are Ericeira Town and Bay; a league from which town is the Convent of Mafra, a celebrated structure, on the summit of a high hill, forming a remarkable object, by which this part of the coast may be distinguished.

CAPE ROCA, or the Rock of Lisbon, lies 4 leagues from Ericeira. The position of the cape or rock, from the mean of various observations, is latitude $38^{\circ} 48' 30''$ N., longitude $9^{\circ} 29' 43''$ W. The cape is broad and moderately high, steep towards the sea, with a tower on its summit, which exhibits a revolving light 598 feet above the level of the sea, visible in clear weather 21 miles. Each revolution of the light is performed in about two minutes. During one minute it appears as a red light, the greatest intensity of which continues 30 seconds; during the second minute it appears as a bright light, the greatest intensity of which also continues 30 seconds.



Cape Roca (A). The summit B bearing East (true), distant 3 leagues.

Near Cape Roca is a high rock, and further out a shoal, over which the sea breaks, although near its outside are 40 fathoms. The land suddenly rises inland to a remarkable mountainous ridge running easterly, with several irregular risings, having on its northern slope the Town of Cintra, from which it takes its name, and being a good mark to know the coast by.

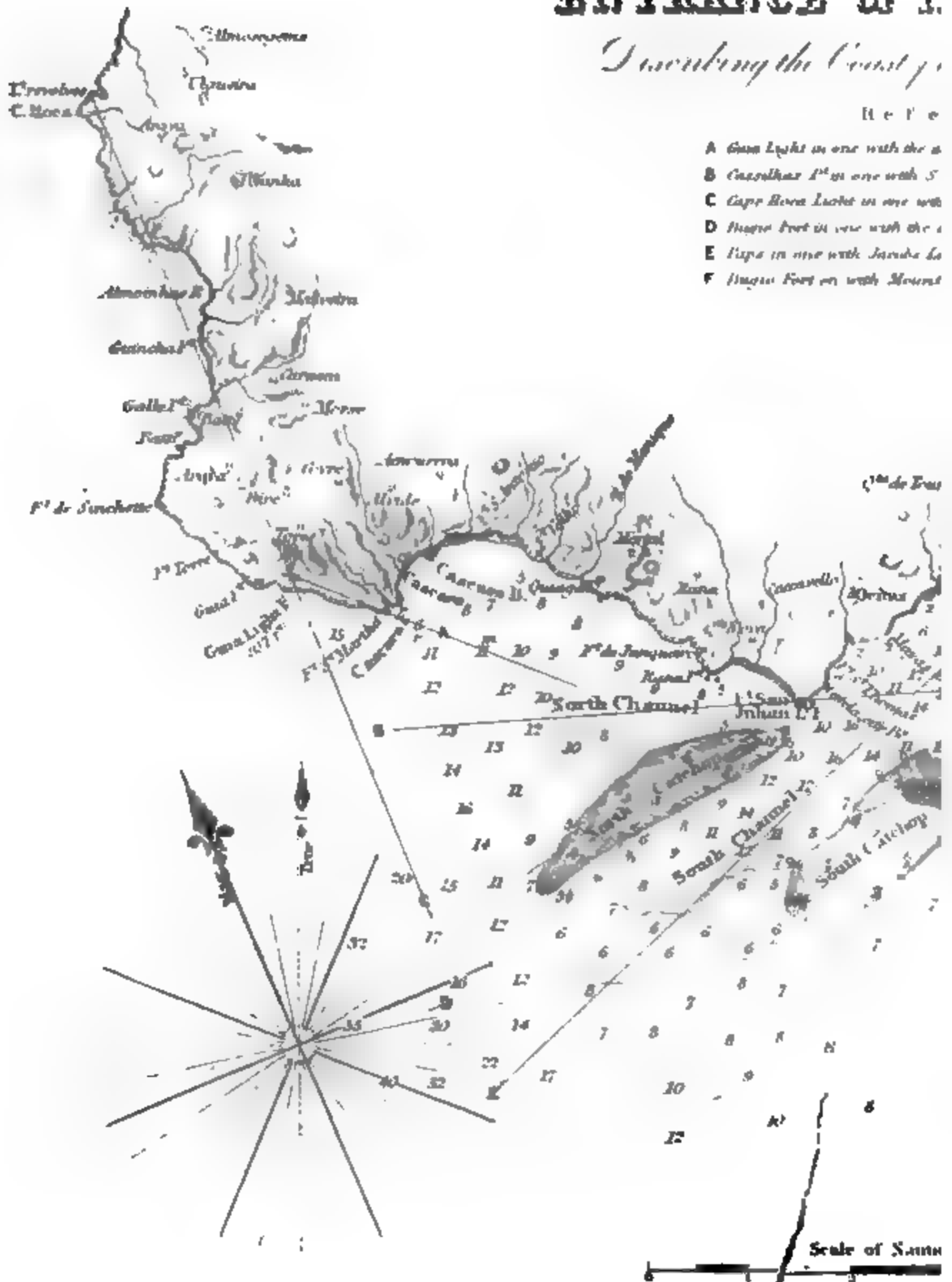


Cape Roca.

S. by W., 4 miles, from Cape Roca is Cape Razo, or Point Sinchette, having a reef very near it. The intermediate coast forms a bay, which is enclosed by a high steep coast, excepting near the point, where there is a flat beach. From Cape Razo, the coast eastward to Fort St. Julian is everywhere steep, but clean, excepting at Point Rana, about a musket-shot to the west-

Swearing the Coast,

- A *Gum Light* in one with the 4
- B *Cassiopeia 1st* in one with 5
- C *Cape River Light* in one with
- D *Major Fort* in row with the 4
- E *Lips* in one with *Jacobs* 4
- F *Major Fort* in one with *Major*



1 RIVER TAGS,

● Cape Horn to Iquique.

□ □ □

1875-76 *Marshall, J. H. & B.*

WILLIAM ESPIE

Ergebnis einer der Untersuchungen am 17. Mai

Prof. Dr. Gerd Gigerenzer

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Source: S.E.J. 21



ward of that fort, where the ground is shoal. You will, in advancing towards the Tagus, perceive the lighthouse named Na. Sa da Guia, from which a fixed light is exhibited at 207 feet above the level of the sea, visible 12 miles, and farther on the Fort, Town, and Bay of Cascaes, where there is good anchorage, in from 8 to 12 fathoms, sheltered from N.W., North, and N.E. winds. The bottom of the bay is of sand and mud, and the marks for anchoring are, Guia Lighthouse in one with Fort Sta. Martha, bearing about N.W. $\frac{1}{4}$ W., and the Town of Cascaes nearly open to the northward of Cascaes Fort, as the rocky irregular bottom extending from the fort will be thus avoided. A vessel may lie in these roads generally throughout the summer months, the wind being invariably from the northward; but immediately the wind comes from the southward, a heavy swell is thrown into the bay, in which case she should either run to sea, or go through the South Channel into the Tagus. Small coasting-vessels lie within Cascaes Fort, bringing it to bear W. by S., being there protected from the westerly swell. Boats are hauled up on a sandy beach, under the wall that continues from Cascaes Fort towards the town.

About 4 miles from Cascaes is Fort St. Julian, at the entrance of the Tagus. This fort is large, and situated on a high, steep, projecting point, having a small reef before it. The Light-tower of St. Julian, which stands near the centre of the fortress, is 128 feet in height above the sea, and is lighted by night throughout the year. At 5 miles to the eastward of Fort St. Julian is the Castle of Belem, standing upon a low sandy point, with a battery about it towards the river; it is insulated at high water. Bull Bay, an indent on the south side of the City of Lisbon, is 3 miles above the Castle of Belem, and between are the towns of Belem and Alcantra, which in fact may be considered as the suburbs of Lisbon.

A notice was issued in October, 1847, to the effect that a strong red light was to be shown at the Custom-house Station of Bom Successo, a little below Belem Castle, in order that vessels coming in at night might be enabled to avoid the spit of sand extending out from that point. The light can be easily distinguished from all others in the vicinity.

LISBON.—The City of Lisbon, the capital of Portugal, is finely situated on the north side of the Tagus, and is sheltered on the N.W. by a range of mountainous land: it is built in the form of an amphitheatre, and its patriarchal church having a dome, with the royal palace and other public edifices, present a magnificent aspect from the river.*

By an official notice, dated Lisbon, November. 26th, 1841, the two pilot-boats stationed at the bar, to furnish pilots to vessels seeking this port, will henceforth bear a blue flag, hoisted at the extremity of the yard, instead of

* The following is a copy of a notice posted at Lisbon, 11th April, 1839:—

Art. 1st. All foreign ships entering the ports of this kingdom in ballast, and loading a full cargo of salt, shall be free from the tonnage duty. Foreign ships entering any of the ports of this kingdom in ballast, and sailing out again, to take a full cargo of salt at another of our ports, are equally free from the tonnage duty.

Art. 2nd. All foreign vessels entering the ports of this kingdom under *Franquia*, in order to complete their cargoes with salt, shall pay the duty of 100 reis per ton.

Art. 3rd. All foreign vessels entering the ports of this kingdom to discharge cargoes of merchandise, and here load a full cargo of salt, shall pay the duty of 100 reis per ton.

Art. 4th. All foreign vessels which, having paid the tonnage duty in one of the ports of this kingdom, sail in ballast to another port of the kingdom in order there to take a full cargo of salt, are entitled to receive back the duty paid in the first port, with the deduction merely of 100 reis per ton, on presenting to the competent authorities a legal certificate of the said payment.

Art. 5th. The depositions of the Article 7th of the Royal Decree of 14th November, 1836, relative to the payment of tonnage duty on Portuguese vessels, are applicable to the Articles 2nd, 3rd, and 4th of the actual law.

Art. 6th. All former legislation, contrary to the present law, is hereby revoked.

the pendant hitherto used by them, as the latter may be confounded with the pendant used by them as owners' signals.

The entrance to the Tagus is encumbered by two shoals, named the Northern and the Southern Catchop, which form two channels into the river; the north, or little channel, being between the Northern Catchop and St. Julian's Land; and the south, or great channel, between the two Catchops, constituting what is termed the bar.

The North Catchop is a rocky shoal, with from 3 to 4 fathoms on it; so that, with the swell of the sea from the westward, when the ebb-tide is prevalent, the sea breaks over it most furiously. It is shoalest towards its northern part, which is about a musket-shot from Fort St. Julian; thence it extends West, $2\frac{1}{2}$ miles.

The South Catchop is still more shoal than the northern one, for its north-eastern part is always dry. On the middle of the bank, about S.E. by S., distant $1\frac{1}{2}$ mile, from Fort St. Julian, is the Bugio Fort, on the tower of which (St. Lourenzo) is a light 110 feet above high water, which revolves in $1\frac{1}{2}$ minutes: the duration of the strong light is not above 12 seconds, and, as it may be clearly seen at the distance of 18 miles, when the weather is fine, it becomes an object that you cannot possibly fail to recognise. At low water the Bugio appears to be erected upon a dry bank, but on the rising of the tide the water washes the very walls of the fortress. Between the South Catchop and the shore there is a small channel, affording a passage for boats only *

The following directions, by Mr. W. Chapman, R.N., were written in 1806:—

"The best leading-mark over the bar of Lisbon, through the South Channel, is the King's look-out-house, a sail's breadth open to the northward of the Paps or tops of the hills. But should a stranger be close off the bar, without a pilot, and the wind and weather such as to make him apprehensive that he cannot keep an offing for the following day, I would advise him not to attend to the above marks, but proceed according to the following directions. He could not be mistaken in the Bugio (a small round fort with two tiers of guns, and above them a small lighthouse); it is built on the South Catchop, forming the starboard side of the entrance, and quite alone. Neither could he be mistaken in the point of the City of Lisbon; it is the only point of land covered with houses, and which appear to run into the north side of the river, about 8 miles above the Bugio. They should be brought on with each other before you run in for them; they will then bear very nearly East by compass; bear round up and run in for them without fear, and when you are about 4 miles from the Bugio, you will suddenly begin to shoalen your water to 6 fathoms on the bar or bank, which unites with the two Catchops, at about one-third of a mile to the southward of the North Catchop. Run in on the same direction until you have crossed the bar, and are within $2\frac{1}{2}$ miles of the Bugio. You will again deepen your water to 10 or 12 fathoms. As soon as St. Julian Castle bears N.E. by N. by compass, you will be about mid-channel, and your soundings will likewise shoal gradually as you approach the South Catchop, on this line of direction; but having the above bearing of St. Julian, you should steer directly between it and the Bugio, and when up

* It was announced in December, 1845, that the Portuguese Government intended to buoy the channel across the Bar of the Tagus, and to station lifeboats at Paco des Aroos and Tefaria, completed with the necessary gear, and manned with hardy fishermen. These measures were to be adopted as soon as the weather would permit; the buoys had been obtained from this country, and two vessels were to be purposely built for this service, of the size and description of those in use at Oporto.

with them, keep on the north side of the river as there is good anchorage all along that shore. The tide flows on full and change days on the bar, until half-past two, and spring tides rise nearly 16 feet.

“ By attending to these marks I have frequently run in from sea, and never found a stranger who did not readily understand them. The only fear is when a strong ebb tide is running, which, with a strong wind from the sea, makes a complete break sometimes all across, in which a vessel is often almost unmanageable, and the tide may sheer her about, but when near mid-channel the direction of the tide is straight through.

The leading mark through the North Channel, between Fort St. Julian and the North Catchop, is Guia Lighthouse on with the centre of Fort Sta. Martha, bearing N.W. $\frac{1}{4}$ W.;* the depth at low water, spring tides, is 6 fathoms. When the Tower of Bugio comes on with Mount Cordova, by keeping them in one, until the north side of the Tagus is open with the Castle of St. Julian, clears every danger. The only danger in running through this channel with an ebb tide is, when you open the river to the eastward of St. Julian, where you will meet the tide setting very strong on the north end of the North Catchop, and if the wind fails, anchor immediately, and weigh on the flood which sets directly through the channel. Being in the centre of the channel off Point Rana with the boats, they drifted through it with the leading marks on; the flood tide sets very strong. There is little ebb tide until the river is open.”

The following is extracted from the *Nautical Magazine*, 1840, page 690:—
“ If a fine clear night when off Guia Light, and should there have been much rainy weather, and reason to apprehend freshes in the river, and it be at the same time ebb tide, and the moon near full or change, a good deal of time will be saved by entering through the north channel; to do which steer S.E. by E., and it will take you to Fort St. Julian, to pass between which and the North Catchop, you must depend entirely upon your eyes. But it is by no means difficult. The castle may be passed very close. The only precaution necessary in approaching this narrow channel, is not to get the light to the south of the above course, until you are sure you are passed the low point of the coast, marked on the chart as Point Rana. Then steer between the breakers on the North Catchop, which are always readily seen (except in extraordinary fine weather and slack tides, when sometimes the sea does not break at all) and the castle. There often is a very great annoyance in approaching either of these channels in the night, from the number of fishing-boats you will encounter.

“ As soon as a vessel appears coming round Cape Razo, such a multitude of brilliant lights will start up, right in your way, as will defy all attempts at discovering the lights at Bugio, and Fort St. Julian; but steer your course right through them; they are however often so numerous, as to require great care not to run over them, and, as this fleet of small craft is a good distance outside the entrance, you will be clear of them so as to see the lights in sufficient time.

“ Having entered at either channel, you can hardly fail seeing your way up the river: a course E. by S. or E. according to your being over on the north side (as you should be), or in the middle of the river, will take you to Belem, 5 miles just above which, sheer in towards the north shore, about half a mile above the castle, and anchor in 5 fathoms, in a situation of perfect slack. By no means bring up in from 14 to 17 fathoms, as you will then be in the strength

* By running with Guia Lighthouse on with Fort Sta. Martha and paying no attention to Mount Cordova, you will pass a spot with only 5 fathoms.—Lieut. Ogle, and Mr Hunter, Master of H.M.S. *Spartiate*, 1837, *Nautical Magazine*, 1840, page 689.

of the tide, which at the springs runs with very great velocity; sometimes when much rain has fallen, as much as 7 knots.

"In proceeding up to Belem, if ebb tide, and you keep well over to the north shore, you will meet the tide running with very diminished force, and you may continue just so near as to keep the bold southern shore (which is well up the river, a little above where the men-of-war lay), open of Belem Castle; in other words, to keep the river open, if you cannot see to do this, bring up.

"On leaving the Tagus by the South Channel, just reverse the directions given by Mr Chapman for entering, and if going South, when (with an ebb tide) St. Julian bears N.N.E., you may keep away S. by W., which will carry you to Cape St. Vincent, (on it) 99 miles, but should there be much sea, or flood tide, or strong west wind, bring St. Julian to bear N.E. by N., either of these proceedings will, according to the circumstances, carry you clear of the South Catchop. Coming from the south, these courses reversed will serve. Get St. Julian on one of the above bearings, steer for it till Bugio comes on with the Point of Lisbon; or if night, bring the light east, and then steer betwixt the two; which will be about an E.N.E. course, and which will carry you safely in, and up to the north shore."

Mr. G. Biddlecombe, R.N., makes the following observations on the entrance of the river:—

"The North Channel into the Tagus requires a thorough knowledge of the tides, and also a strong commanding breeze. Having passed Guia and Cascaes, steer in, so as to bring Cassilhas Point (the eastern termination of the south shore) in one with the southern face of Fort St. Julian; continue on that mark until Guia Lighthouse is brought in one with the angle or centre of the high part of Fort Sta. Martha. This is the mark for the mid-channel, and will not lead into less than 6 fathoms at low water. When the centre of Mount Cordova (on the south shore) comes in one with Bugio Tower, bearing about S.E. $\frac{1}{4}$ S., steer for Bugio until Fort St. Thomas (which is white) opens to the eastward of the Yellow Fort of Catelazeite, in order to clear the shoal off San Julian, but carefully allowing for the tides, as the flood sets right on the shoal to the S.E. of San Julian, while the ebb sets directly on the North Catchop.

On entering the South Channel with a fair wind, and rounding the southern extremity of the North Catchop, keep the Peninha (or western part of Mount Cintra) open to the westward of Cascaes Fort, N. $\frac{1}{4}$ E. until Bugio Fort comes in one with the Estrella dome E. $\frac{1}{4}$ N. Then steer towards Bugio, keeping it in one with the Estrella dome, in which line the bar connecting the North and South Catchops will be crossed in the deepest water, and in not less than $6\frac{1}{2}$ fathoms; and when the Paps are in one with Jacob's Ladder, E.N.E. $\frac{1}{4}$ E., the bar will have been passed, and the depth of water will have increased. Now run up with the Paps in one with Jacob's Ladder, or, if the wind hangs to the northward, borrow as far as the northern turning mark (the Paps in one with Caxias, E.N.E. $\frac{1}{4}$ E.) On the contrary, if the wind be from the S.E., borrow towards the southern turning mark, which is the eastern part of the Paps touching the north-western end of the range of buildings at Boaviagem, and bearing about E.N.E., but avoid getting too near Bugio, as the tides there are difficult, and it is steep-to. Having passed between Bugio and San Julian, keep towards the north shore till Belem Castle is in one with the south part of the City of Lisbon, bearing E. $\frac{1}{4}$ S., which clears all the shoals to the northward of the sandy flat inside of Bugio. Pass Belem Castle at the distance of two to three cables' length, and then proceed *to the anchorage, keeping the whole of Fort San Julian and all its outworks open to the southward of the parapet of Belem Castle, which will clear the*

shoals of Alcantara, until the vessel arrives off the Packet Stairs, where there is anchorage in from 10 to 14 fathoms, or farther up in 12 to 16 fathoms mud.

Turning through the South Channel into the River.—On standing towards the south-west tail of the North Catchop, keep the Peninha open to the westward of Cascaes Fort (N. $\frac{1}{4}$ E.), by which there will not be found less than 12 fathoms, until the south part of the City of Lisbon is in one with Bugio Fort, E. $\frac{1}{4}$ S., and then hauling the wind stand on until the eastern part of the Paps touch the north-western part of the buildings at Boaviagem, bearing E.N.E., which is the southern turning mark. So long as the Peninha is open to the westward of Fort Velho, you may cross over as far as that southern turning mark, but when the Peninha opens to the eastward of Fort Velho, it is unsafe to stand quite so far over, on account of the strong eddy which sets towards the South Catchop, the edge of that shoal being in some places steep-to. Towards the North Catchop, you may stand till the northern turning mark comes on, the Paps in one with Caxias, about E.N.E. $\frac{1}{4}$ E., where the water is deep, and the flood tide sets straight up the channel, but remember that the North Catchop is on that side steep-to.

The $3\frac{1}{4}$ fathoms shoal off San Julian extends a short distance from the fort, but deepens immediately to 7 fathoms; Fort St. Thomas open of the small Battery of Catelazeite, on the point near to the southward of it, clears this shoal.

Having passed San Julian and Bugio continue to work up the river to Belem, standing over to either shore as far as in to 12 fathoms: but a good mark for turning clear of the shoals on the southern shore, inside of Bugio, is Belem Castle in one with the Citadel of Lisbon, which stands on the first rise of the land from the south point of Lisbon. The edge of the shoal continues very irregularly along the shore as far as Trafaria; and abreast of Torrao, a large white building in the bight, it stretches out full half a mile off the shore. Near Trafaria, a rocky ledge extends a quarter of a mile in the direction of Caxias, and with deep water close to it. When above Trafaria the south shore of the river is clear, with deep water the whole distance to Cassilhas Point.

The shoal water on the north side of the river continues along shore to the eastward, about a quarter of a mile off shore, where there is a depth of 5 fathoms, to within a quarter of a mile of Belem Castle, and there the shore becomes so steep, that a depth of 5 fathoms may be had at 200 yards from the castle, and 9 fathoms at 300 yards.

From Belem Castle up the river, stand close over to the south side, which is steep-to, but to the northward avoid getting into less than 12 fathoms, as an irregular shoal extends about 200 fathoms off shore, with 5 fathoms on its edge, and deep water close to it. When nearing the bight at Alcantara, this bank extends farther out, and the mark for clearing it in 7 fathoms is, by keeping San Julian Castle and outworks open of the parapet of Belem Castle, until Alcantara, which appears like the angle of a fort with a watch-tower, bears N. $\frac{1}{4}$ W. The shoal will then be passed, and the shore may be approached until the Tower of San Julian is in one with the parapet of Belem Castle; and this is a good mark for an in-shore berth in 7 or 8 fathoms off the packet stairs, as a line-of-battle ship will be quite far enough out, if she anchor in 12 or 14 fathoms, where good holding-ground of stiff mud will be found, and where she will lie out of the strength of the tides."

GENERAL REMARKS.—In sailing up to Lisbon a pilot is indispensable, in consequence of the powerful operation of the tides, which has caused the destruction of many vessels. Off the city the ebb runs down at the rate of 7

miles an hour, so that the anchors there frequently come home, especially those with buoys, which are of no use, as, from the violence of the current, they are frequently immersed in the water. The flood tide is considerably weaker than the ebb. On the bar at full and change, the time of high water is 11½ h. P.M.; the vertical rise is about 16 feet.

The danger in entering is, when a strong ebb is running down opposed to a strong wind from sea, which makes a complete break sometimes all over the bar. Under these circumstances a vessel is almost unmanageable, and the tide may sheer her about; but in the middle of the Great or South Channel, the tide sets directly through. To enter the river during the ebb, would require a brisk gale and all sails set, in order to make any way, or even to stem the current; and it is to be observed, that within the river, the wind comes very irregularly through the valleys on each side, unless it proceeds from the W. or S.W. It is, however, tolerably steady, when in the direction of the river. The tide draws strongly toward the Bugio Bank, and hereabout, the waters divide into several counter-currents; so that a vessel approaching too near this bank will not obey the helm.

From the Bar of the Tagus the land runs southerly, with a low sandy beach reaching within a mile or two of Cape Espichel, where it becomes lofty; it then turns easterly towards Setubal or St. Ubes. Cape Espichel rises perpendicularly out of the sea to a moderate height, its top appearing irregular, white on the north side, and red towards the south, with a chapel on the summit. To the eastward of the cape is the mountain of St. Lewis, lying inland, and a little to the northward of it is a hillock of less magnitude shaped like a haycock; these, when coming from the sea, are objects to know the land by, and may be seen before you can discern the cape itself.

The lighthouse on Cape Espichel is a square tower, 100 feet high, which shows a fixed light, 627 feet above the sea, visible 12 miles.

About 2½ leagues from Cape Espichel is Cape Ares, which is high land, and to the westward of this are the small Bay and Town of Cezimbra; which you will readily know by a castle built on the top of a hill; here, with winds from the N.W., North, and N.E. quarters you may anchor, holding yourself in readiness to put off to sea, should the wind change. Near the land you have 7 and 8 fathoms; farther out it becomes rocky as far as 30 fathoms; it is then clear, and here large vessels generally anchor, it being safer than nearer the shore.

At 4 miles to the north-eastward of Cape Ares are Fort Arrabida and Cape Sampinedra; the latter has an appearance similar to Cape Ares. Between them the coast is very high and steep, with the exception of a small sandy part to the north-eastward of Cape Sampinedra. You now open the entrance to Setubal.

SETUBAL or **ST. UBES**, is a bar harbour. On the north point of the entrance is a fort, and a little farther in, the old Tower of Outas, having two sentry-boxes towards the sea. You must lay your ship's head on the first sentry-box nearest the fort, bringing it nearly on with St. Phillip's Castle, leaving the castle a little open to the south of the box; and as you enter the river, you will perceive three red coloured precipices, in a rocky cliff, between Outas and St. Phillip's Castle; bring these in one, and it will lead into the river; but the sands at the entrance are very liable to alter, and therefore a pilot should always be taken to conduct you safely in. There are 20 feet over the bar at low water, spring tides. The mariner should observe, in sailing out of this river, to get under weigh at the turn of the tide. At Sebutal there is now a fixed light, at 490 feet above the level of the sea, visible at the distance of 6 miles: it is situated in lat. 38° 31' 9" N., long. 8° 53' W.

At the distance of $31\frac{1}{2}$ miles to the southward of the old Tower of Outas, is Cape Sines, which is not very high but steep, and has two small islets near it, named Percebeiras Islands. The coast throughout this extent is low, and bordered with a sandy flat shore, upon which are sand-hills; it bends a little inwards, forming a bay, near the middle of which is a projecting point of land named Pesqueira.

A short distance to the southward of Pesqueira Point is the bar of the Melides River, which is too shallow to receive any but small vessels. And, to the S. 22° E. and S. 64° E. (true) of the same point, are two small hills, with houses upon them, which are easily distinguished at a considerable distance, and serve for excellent marks to know this part of the coast by. The village upon the southernmost of these eminences is named St. John de Cacem, and is protected by a fort, which is very conspicuous from its size and height.

Immediately after having passed Cape Sines, you will perceive the town of the same name, which contains about 1800 inhabitants, and is protected by a fort lying in lat $37^{\circ} 57' 5''$ and long. $8^{\circ} 51' 47''$, according to the results of a great number of observations made by the surveyors. The coast here forms a bay, into which numerous small rivulets flow, having the entrance towards the south-west. Here vessels occasionally anchor, at a mile south of the town, in from 10 to 16 fathoms on sandy bottom.

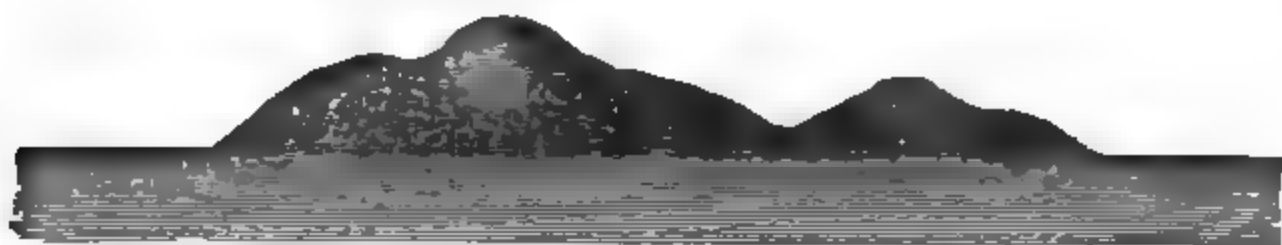
At the distance of 9 miles to the southward of Cape Sines is the small Islet of Pesseguciero, which is a low rock, separated from the land by a narrow passage, where small vessels anchor in fine weather, in from 10 to 18 feet, upon a stony bottom. Opposite the islet is the Fort of San Joao de Sines, and at a short distance to the northward is a small creek, frequented by vessels when in want of fuel.

VILLA NOVA.—At three leagues from the Islet of Pessegueiero is the entrance to VILLA NOVA DE MELPONTES; the land towards which is low, and the beach sandy; at one spot is a reddish coloured precipice, which, with another lying W.S.W. of the bar are objects to know this part of the coast by. Villa Nova has a bar at the entrance, over which are only 2 fathoms at low water, and from the southern point of the entrance a sand stretches out; between Pessegueiero Island and Villa Nova, small vessels may lie in 2 and 3 fathoms under the protection of a fort near the island. About 3 leagues to the southward of Villa Nova is Cape Sardao, which is a point of high land; 5 leagues farther on is Arrifona, having a bay where vessels may ride in 8, 10, and 12 fathoms, under the guns of a fortress; at the entrance is a rock resembling a ship under sail, surrounded with other small ones. About $5\frac{1}{2}$ leagues from Arrifona is Cape St. Vincent.

CAPE ST. VINCENT is situated in latitude $37^{\circ} 2' 54''$, and longitude west from Greenwich $9^{\circ} 0' 54''$, is of moderate height, but to the northward of it the land is much higher, having many rocks about it. On the cape is a convent, and about 20 fathoms from the foot of the cape is a rock, large and high; there being a passage between it and the land, with a depth of from 10 to 15 fathoms, coarse sand and shells; outside the rock, at a boat's length, are 11 and 16 fathoms, and at a cable's length, 20 fathoms. About a league to the S.W. of Cape St. Vincent is a tide-rip, which has frequently been mistaken for a shoal.



In coming from sea, and making for this part of the coast, you will first perceive the Monchique Mountains, which range along east and west, being divided into two parts; those to the westward are both larger and higher than those to the eastward; their summit bearing from the cape about E.N.E. $\frac{1}{2}$ E., and may be seen in a clear day full 25 leagues off. Having obtained sight of these mountains, you will next descry the elevated land to the northward of the cape, which will readily point out the situation of the cape itself.



Monchique Mountains, bearing N. 67° E., (true) distant $17\frac{1}{2}$ leagues.

Upon the western part of Cape St. Vincent there is now a lighthouse, from which a light is shown, revolving in two minutes, during which time a brilliant light appears for a short period, and is then succeeded by darkness. The building stands in lat. $37^{\circ} 8'$, and long. $8^{\circ} 59' 30''$ W., and shows the light at 221 feet above high water, visible about 19 miles.

ROCK OFF CAPE ST. VINCENT.—This rock is said to lie at the distance of 12 or 15 leagues S.W. of Cape St. Vincent. In the year 1813 the *Dædalus* struck upon it, and received so much damage as rendered it necessary to put into Lisbon for repairs. In 1821, the *Briton*, Captain Stokes, struck upon the rock, and was lost in consequence; the crew took to the boat and were picked up by another vessel; the captain had not seen the cape, but supposed it at the time to bear N.N.E. $\frac{1}{2}$ E. true, distant about 80 miles. The frigate, *Indefatigable*, when commanded by Sir Edward Pellew, once touched on a rock, supposed to be this, and it is much to be regretted that its true position is not yet determined.*

Nearly 3 miles from Cape St. Vincent is Point Sagres, nearly of the same height and perpendicular, but the coast thence to the N.E. declines in height. Point Piedade, 5 leagues to the eastward of Sagres, marks the entrance of the Port of Lagos, and is the termination of a range of high land, named that of Barril. This point, according to Tofino, is in latitude $37^{\circ} 6' 54''$, and longitude $8^{\circ} 37' 30''$. It is of moderate height, broken and rugged, with a number of large rocks before it. On the summit is a chapel, and on the south side a shoal extending to the distance of nearly half a cable's length.

THE BAY OF LAGOS is clean and capacious. In summer a number of vessels may anchor within it, sheltered from N.W. to the N.E. winds, but exposed to all others. Within less than a cable's length from Point Piedade, there is a depth of 9 fathoms. For a ship of war the best riding will be 18

* The existence of this rock has since been confirmed by Mr. John Avea, master of the schooner *Tandvy*, of Plymouth, who saw it on March 6th, 1839, and says:—"On my passage to Zante on the 6th instant, at 9h. 30m. P.M., I went close to the eastward of it, indeed much closer than I wished; and as we did not see it till close aboard, it was with difficulty avoided. There was a swell from the N.W. at the time breaking over it, and a sheet of foam around, about 20 to 25 fathoms in circumference. The top of the rock might not be large, but no doubt can remain that a rock is there; and it must be regretted that the position of such a dangerous one has not been ascertained. We stood in N.N.E. on the starboard tack, till 7 next morning, when we tacked to the southward, the cape then close aboard, distant about two miles. In my opinion, the rock is laid much too far to the westward in the charts, and I should say that it bears about S.S.W. (true S.), distant about 37 or 40 miles from the cape. This might be a caution to some of my brother mariners navigating round the said cape, not to stand too far off."

fathoms, east from Point Piedade, distant one mile; a frigate may lay nearer to the shore in 15 fathoms, and smaller vessels before the town in 8 fathoms. The northern beach is low, and the river within navigable, but requires a pilot, for near its mouth the bottom is rocky, from the shore outward to the depth of 18 fathoms.

Seven miles from Point Piedade lies Ponta de los Hermanos, a point of middling height, not projecting, and this is considered as the termination of the Bay of Lagos.

VILLA NOVA DE PORTIMAO is 10 miles E. $\frac{1}{2}$ S. of Point Piedade. It has a shoal bar, and on each side a battery.

Instructions for vessels intending to run into the harbour: signals made at the Fort of Ferraguda, on the east side of the bay.

1. A red flag, with a broad pendant under the same, indicates that ships are to choose a proper place where to take a pilot on board.

2. A broad pendant, with a red flag under the same, signifies that no pilot can be sent on board.

3. The Portugese flag, with a red one under the same, is a signal that ships must immediately return to sea again.

4. A red flag by itself signifies that a ship may approach the bay to take a pilot on board.

5. If it should happen that on account of stormy weather he could not venture to leave the bay, and ships are forced to enter the same without one, signals will be made with the red flag from the fort.

Captain Smyth, R. N., observes that "Lagos and Villa Nova de Portimao, in time of war with Spain, are of the utmost importance, more particularly if Cadiz is blockaded, as vessels will be despatched there for water; on which occasion it will be necessary to observe the following instructions:—At half-flood the boats can get near enough to land the casks, and may be taken off as late as a quarter ebb. The tide ebbs and flows in Lagos River at 2 o'clock, full and change; it rises about $13\frac{1}{2}$ feet with the spring tides, and 9 with the neaps. The bar is just covered at low water; at high water it will have 14 feet on it with spring tides, and 10 with neaps. In fine weather, about 180 tons of water may be rafted off in 24 hours. Refreshments such as poultry, pigs, rabbits, pigeons, fruits, vegetables, &c., may be procured on reasonable terms.

"In Villa Nova River water may be got in transports, at about 150 butts in 24 hours; these must be rafted 3 or 4 miles down the river with the ebb tide, the water being too shoal for ships to go nearer to the fountain where it is procured. There is a depth of 16 or 18 feet water on the bar; but, in my opinion, it is only a summer watering-place; for the Portuguese told me that in winter, the bar is seldom passable for ships, as the breakers are very dangerous, and the swell is a long way outside it. At the lower watering-place a butt may be filled in 8 minutes, and at the upper watering-place in 7 minutes."

Five miles from Villa Nova is Cape Curvoeira, moderately high, having the Fort of Encarnacion, near it, serving for the defence of two small bays lying on each side of the cape. Two miles farther is another fort, La Rocha, built upon a bluff point, which projects into the sea, having a small bay on each side of it, affording shelter in winds from the N.E. and N.W.

Nearly E.S.E., $5\frac{1}{2}$ miles, from Cape Curvoeira, is the Point of Albofeira, on the east side of which is a small bay, the town being at the farther end, built upon a height near the shore, and enclosed with walls and ancient towers. On the beach is a battery. Vessels may here find shelter from winds in the N.W. to the N.E. quarter, the anchorage being good. S.E. from Point

Albofeira, 12½ miles, is the city of Faro, the coast forming a circular bight; midway stands the Town of St. Antonio de la Quarteira, built on a rising ground, with a river and fort adjacent.

The city of Faro stands at the distance of 12½ miles to the south-eastward from Albofeira. Cape Santa Maria, or St. Mary, the southern extremity of three low islands, lies S.E. by E. ¼ E., distant 18 leagues from Point Sagres of St. Vincent. The three islands form the channels of the Port of Faro, each of which has a bar; that on the west is called the Baireta, or Little Bar, and has only 10 feet over it at high water; that on the east is the Great Bar, and has 13 feet; the middle one called Barra Nueva, or the New Bar, 9 feet. Eastward of Faro may be seen the Chapel of St. Antonio, and farther east, the village of Hullon. The middle island properly forms the Cape Santa Maria, which is low and sandy, with 2 and 2½ fathoms, a cable's length from the shore; three cables' length off are 3 fathoms; and at the distance of a mile off, are 9 fathoms, rapidly increasing to 20 and 25 fathoms; so that, at a league off, there are 80 and 90 fathoms, and a little farther, no ground at 150 fathoms: the bottom is generally sandy, with some small shells intermixed. On Cape Santa Maria there is a fixed light, which is 109 feet above the level of high water, visible, in clear weather, 15 miles.

In making for this cape, you will observe an inland mountain, named Monte Figo, which is visible 16 leagues off, and not like any other about this part. When seen from the westward it appears by itself, and not attached to the northern range of hills, but when viewed from the southward they will appear grouped and confounded together. It will, in coming from the westward, not be seen before you have passed Sagres, and cannot be perceived at the distance of Cape St. Vincent. There is a little hill to the eastward of Mount Figo, which somewhat resembles it in shape, called the Little Mountain.

To the eastward of Cape St. Mary is the small barred entrance of Foseta, and a little farther on is Tavira, fit only for small vessels and coasters, and then only to be entered with a pilot; but before the latter place you may anchor in 4 or 5 fathoms, having the wind off shore. The whole coast from the Great Bar of Cape St. Mary to Tavira is encumbered with islands, separated from the main by narrow channels and salt ponds, navigable by boats; ridges of high land appear up the country from Mount Figo to Ayamonte, the latter being a remarkable object, and visible still farther off than Mount Figo. About 4 leagues from Tavira is the entrance to the River Guadiana, which here divides Portugal from Spain.

THE RIVER GUADIANA is bounded on the west side by Point St. Antonio, which is low and sandy, having a reef or bank extending from it nearly south, above a mile, called the Western Picacho, and on the east side by Point Canelas, from which also a similar sand runs out about 2 miles, named the Eastern Picacho; between these banks the channel or bar is about a cable's length in breadth. On the western side is the town of Villa Real, and farther on Castle Marin, but, between these places, a branch of the river runs to the westward. One mile up the River Guadiana stands the Town of Ayamonte, on the opposite or eastern side. This part of the coast may be known by a remarkable mountain named Monte Gordo, which stands above Ayamonte. In sailing for the bar it will be requisite to engage a pilot, as the general depth upon it, at low water, is only 6 feet, but within the bar will be found 3 fathoms. Here it is high water on the full and change at 3h. p.m. Vertical *rise of spring* tides, 12 feet.

THE COAST OF SPAIN.

FROM THE RIVER GUADIANA TO GIBRALTAR.

Between the Rivers Guadiana and Guadalquivir there is no place of trade which can be entered by a stranger without a pilot. Every river has its bar of sand, and the coast is low and sandy. The distance from the bar of Ayamonte to that of Huelva or Palos is 7 leagues; and from Palos to St. Lucar, the seaport of Seville, 10 leagues. Within the latter extent is a chain of sand-hills, upon which stand several towers, and by these the distance may be estimated. On the north side of the entrance to St. Lucar are the Point and Tower of St. Jacinto, which appear among the sand-hills, at about three cables' length from shore. From this point, on the N.W. is a dangerous rocky shelf, named the Cape Bank, some parts of which appear above the surface at low water; it is about a mile in length, and half a mile broad.

Within the extent of two miles, W.S.W. $\frac{1}{4}$ W., from the extremity of the Cape Bank, are three rocky shoals, which may be considered as the bar of St. Lucar; and of these the outer one, Picacho, appears above the surface at low water.

SAN LUCAR.—Nearly S.W. by W. from Point Jacinto, distant 4 miles, is Point Chipiona, or the southern point of the River Guadalquivir, low and flat, having a reef running N.W. from it about a mile, named El Perro, or the Dog; within it a number of fishing crawls may be seen. W.N.W. of Chipiona, about 2 miles, lies the north end of the Sabinal Shoal, extending about a mile N. by W. and S. by E.; at low water this bank is visible, but at other times the sea breaks over it; near its western side are 5 fathoms, but there are other shoals between it and the land.

At the distance of half a league to the eastward of the Perro and Point Chipiona, is Point Montigos, low and rocky, with a reef extending along shore to St. Lucar, 2 miles, which is $1\frac{1}{4}$ mile broad, so that the channel between it and the Picacho, before noticed, is narrowed to so small an extent, that with scanty or contrary winds, no vessel drawing more than 14 feet should attempt it, even at high water, it being too narrow for any but coasters. The depth of the entrance, low water, spring tides, is $2\frac{1}{4}$ fathoms; at high water 2 fathoms more: the bottom gravel. From the above it is evident that every stranger ought to have a pilot, if bound in for St. Lucar. From St. Lucar large vessels ascend to Seville, which is more than 16 leagues from the sea.

THE COAST TO CADIZ.—S. by W. $\frac{1}{4}$ W., $1\frac{1}{4}$ mile, from Point Chipiona, is the Corrales of Regla, a dangerous flat covered with rocks and stones, extending outward to half a mile from shore; a number of fishing crawls are extended before it to the distance of 2 cables' length. Between Point Chipiona and this shoal the coast forms a bight, with a flat beach, in the bottom of which near the shore you will see the Convent de Regla, and farther on the tower and high land of Beva.

Point Candor lies 6 miles south from Point Corrales. At one-third of this distance is Point Meta; and at more than two-thirds, the Castle of Almadraza. The coast is flat and bordered with rocks. The point, small, flat, and sandy, lies in lat. $36^{\circ} 37' 15''$ and has a reef running from it all the way to Rota, at the entrance of the Bay of Cadiz. This place has a pier near the point, but it admits small coasters only, and those at high water.

BAY AND HARBOUR OF CADIZ.—The entrance to this harbour is between the Town of Rota and the City of Cadiz. Cadiz is the first commercial city of

Spain, being the centre of commerce with the Spanish Colonies. It is situated on the end of a low peninsula, constituting the northern extremity of the Isle of Leon. This Isle is separated from the main by the Rio de Sancti Petri (Holy Rock), which is three leagues in length, with a depth of 3 and 4 fathoms. Puerta Santa Maria lies 5 miles to the north-eastward of Cadiz. The River Guadaleta, which flows past it, is navigable, but has a bar of only one foot at low water. The City of Cadiz, being destitute of good water, is supplied from this place. San Fernando stands on the eastern side of the Isle of Leon, distant 7 miles from Cadiz, and is connected to the main land by a bridge over the River Sancti Petri. On the other side is Caracea, which includes the arsenal, &c., &c.; and on the shore of the inner road, opposite to Caracea, is Puerto Real, a small town inhabited by seamen, workmen, &c., principally supported by the neighbouring salt works.

The Trocadero is a channel 2 miles long, lying to the westward of Puerto Real. It is furnished with extensive quays, and has several maritime establishments. This channel is only 34 yards broad, and vessels going in or out have therefore to wait for full tide, as at the mouth, the depth at low water is only 7 feet, increasing inwards to 9, 10, and 12 feet.

The Tower or Lighthouse of St. Sebastian stands on the west point of Cadiz in lat. $36^{\circ} 31' 53''$ N., and long. $6^{\circ} 18' 10''$ W.; the light is excellent, and revolves once in two minutes, and is clearly seen in fine weather 15 miles off. S. by E. $\frac{1}{4}$ E. from the lighthouse, at the distance of $5\frac{1}{4}$ miles, stands the Torre Gorda or Great Tower (named also the Tower of Hercules) on the top of a little sand-hill; it is round and below it is a battery. Care must be taken that it be not mistaken for the lighthouse of Cadiz, especially in thick weather, as the coast between is a very low beach, and without it are several reefs. It is also to be observed that at a distance of 12 miles, N. $\frac{1}{4}$ E. from the lighthouse, stands the Casa de Beva, a tower on a lofty ridge, which may be seen from the surrounding country at a great distance; it is square, has a cupola on it, and stands between two large houses. From Rota the bearing and distance to this tower are N. by E. $\frac{1}{4}$ E., six miles.

ROCKS AND SHOALS.—From the Point of St. Sebastian a reef extends more than half a mile to the west; and at a third of a mile from the lighthouse, N.W. by W., is the La Olla or Kettle Rock, having only 6 feet water over it. N.N.E. $\frac{1}{4}$ E., about one mile from the same tower, are two small black rocks, named the Cochinos or Pigs, visible at low water, but covered at full tide; these are in a line with the two towers of the Carmelite Church; within these, and near the shore, is the Friedera Shoal, always covered, but the sea breaks on it when there is any swell from without the bay; the distance from the Cochinos to this shoal is 420 fathoms, and it lies with the Church of the Carmelites bearing S.E. $\frac{1}{4}$ S.

The Puercas or Hogs are a cluster of black rocks extending E. by S. and W. by N.; they are always distinguishable by the breakers at high water, and visible when it is low tide. The bearing and distance of these from the Cochinos are E. $\frac{1}{4}$ S., nearly half a mile. La Cruz Rock is above water, the largest of a number lying close to the wall at the foot of the bastion of the Bonete, or westernmost bastion of Cadiz.

El Frayle, or the Friar, is a rocky shoal, off the N.W. Bastion of the town, behind which may be seen the Carmelite Church before mentioned. Its bearing and distance from the Puercas are S.E., 435 fathoms; the least depth over it is 14 feet. When on the east end of this shoal, the Carmelite Church will be seen between the two sentry-boxes on the bastion of Candelaria; and when on the west end, La Cruz Rock will be in one with the Tower of St. Sebastian.

The El Diamante, or the Diamond, is a rocky shoal S.E. about 165 fathoms, having over it 12 feet at low water being the flag-staff of the Castle Sta Catalina del Puerto, the most part of the Morro of Xeres. The northern part of the shoal is in a line with the southern little hill of Medina, with Fort St. Catherine.

La Galera, another rocky shoal extending from the north, lies at a distance of 412 fathoms from El Diamante, appears to be 10 feet at low water: on the shoalest part of Puerto Real will be on with the first top of the mountain, having two peaks on its summit; and the steeple of St. Domingo will be covered by the Point of St. Philip, about a boat's length; Point St. Philip will then be in a line with the ditch of the Land-port of the city.

Los Corrales, or the Coral Shoal, is one which extends 730 fathoms from the ditch at the land-port of Cadiz to the south-eastward; the depth of water along its outer edge, beginning at the fortifications, is from 4 to 10 feet. The bottom is of rock, with patches of mud.

Between Los Corrales and the Castle Puntales, is the shoal Bank of St. Domingo, on which is 8½ feet: the bottom is of sand and shells. The outer edge of this shoal forms the narrowest part of the harbour, and lies in a line with the Castle of Puntales and Torre Gorda, or Tower of Hercules.

Directions.—Vessels coming from the westward will, as they approach Cadiz, observe inland a ridge of hills, having one among them higher and rounder than the rest; this is named the Moor's Head, and may be brought to bear E. ¼ S., which course will carry you direct to the Tower of St. Sebastian and the buildings of Cadiz. As the lantern is 172 feet high from the base, it may be seen at the distance of between 4 and 5 leagues. Cadiz may distinctly be seen 3 leagues off. In approaching towards the city, a good berth must be given to the rocks in its vicinity.

Vessels sailing into Cadiz Harbour, with a fair and leading wind, so soon as they are in the fairway between Rota and Cadiz, the leading-mark is the Church of Puerto Real in a line with the steeple of the Church of Medina, bearing S.E. ¼ E. This mark leads between the Puercas and the Diamante; but so soon as you have proceeded so far in, as to discover the mole of the Seville-gate of Cadiz open on the east Point of St. Philip, you may haul round and anchor, in 5 or 6 fathoms, with the Castle of Sta. Catalina N.N.E., or in 3½ or 4 fathoms, with the head of the lesser mole bearing west. But if wishing to run on beyond Cadiz, steer right for the Castle of Matagorda, until the Torre Gorda or Tower of Hercules, on the Isle of Leon, opens on the east side of the Castle of Puntales; then laying the ship's head towards Torre Gorda, to the entrance of the narrows, where the north side of Fort Luis and the south side of Matagorda Castle are in a line, whence you stand on for a high tower on the north side of the Town of Leon, and come to an anchor with that tower bearing S. by W. ¼ W., in what depth you please, from 7 to 4 fathoms.

Should a heavy easterly or south-easterly wind, or the approach of night, or an ebb-tide, prevent a vessel from entering the bay, she may come to an anchor without the harbour shoals, in 10 or 11 fathoms muddy bottom. On taking this station in the winter, it is necessary to have the Light-tower of St. Sebastian to the S.S.E. (S.E. true), half a point more or less, with the Castle of Sta. Catalina del Puerto (nearly E. ¼ N.) in a line with the Morro of Xeres.

In summer you may come to more to the N.E., as there is at that season no danger of sudden gales; and you will thus have the advantage of being a

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Spain, being ~~the~~ ^{ward} on the following morning; for in summer in general, the ~~ted~~ ^{ed} on the ~~es~~ ^{es} away from the land in the morning, and so assists vessels in en-
 Isle of Le Ships moor with due regard to the turn of the tides, having the best
 (Holy or to the eastward or S.E., as the winds from that quarter are the
 fath longest winds that prevail here. .

Inner Channel.—With a favourable wind, in fair weather, vessels may run in between the Cochinos, Puercas, &c., and the shore of Cadiz, through a channel having a depth of from 15 to 24 feet. It should not, however, be attempted by any one not well acquainted with this place, or unless in a case of absolute necessity.

Vessels may also enter the harbour by passing to the northward of the Galera. If coming in this way, in a large ship, keep over to the sandy shore northward to the Castle of Sta. Catalina, or to the distance of half a mile from it, until that castle, nearly E. $\frac{1}{4}$ N., be in a line with the Morro of Xeres, whence you may run to the anchorage.

With an adverse wind this bay should not be attempted without a pilot, if one can be obtained, as it is difficult for a stranger to ascertain the marks. It is, however, presumed, that with attention, the following instructions may be useful: Should a vessel be off the Point of St. Sebastian, with an easterly or south-easterly wind, she must give a good berth to the Olla, or Kettle, the shoal which lies off that point, and then bring the Castle of Sta. Catalina del Puerto in a line with the road leading to the Town of Xeres, or with a break in the N.W. part of the Morro of Xeres. This bearing should be kept on, until the two towers of the Carmelite Church in Cadiz, after having appeared in one are again open; here you will have passed the Cochinos, and must haul up to the wind, standing more easterly towards the shore, provided the Castle of Sta. Catalina be open with the Morro of Xeres. In a ship of the line, if this be not the case, you should not stand on so far as to bring the Town of Puerto Real open with Medina, but put about to the southward before that happens, in order to avoid the Diamante. A smaller ship may, however, keep on, if certain of making good way to the port tack, or so that the Puercas be not brought in a line with the Lighthouse of St. Sebastian, but kept open on the west side of them, before Puerto Real be brought in a line with Medina; for if the last objects be kept in one, you may happen to touch on the Diamante.

If standing in on the port tack, before you clear the Cochinos, take care not to go so far as to bring the two towers of the Carmelite Church in one, when the Lighthouse of St. Sebastian bears S.S.W. (South, true), but so soon as the opening between these towers begins to close, put about on the other tack, observing at the same time, that the spire of the Church of Puerto Real be on the break in the land, on the north side of Medina. On the next board you will run between the Puercas and Diamante, taking care not to bring, on either tack, Medina open with Puerto Real, until the steeple of St. Francis, in Port Sta. Marta, appears on the east side of the Castle of Sta. Catalina, when you may continue the course towards that castle, as you will then be to windward of the Diamante. On subsequently standing to the southward, you must not separate Puerto Real from Medina, until the steeple of St. Domingo appears open of the Point of St. Philip, in Cadiz, when you will have weathered the Frayle, and may stand on until the steeple of Puerto Real appears a little to the northward of Medina, when you will be within all the shoals, and may proceed to an anchorage, as already described.

The following is extracted from the Nautical Magazine, 1840, page 761:—
"In proceeding for Cadiz, a steamer of the present day will generally be

off Cape St. Vincent in eleven hours after leaving the Tagus. A course S. by W. will take you on this cape. but about 4 miles before you get the length of the cape, some high land will be seen, a good deal higher than the cape itself, or, the land more to the north, as you get abreast of it, terminating at its north end abruptly, and sloping down a little to the south. When at a moderate distance from this land ($1\frac{1}{4}$ mile is near enough), you will have to steer S.S.W. to pass the cape, which, in tolerably clear weather, will immediately be seen, with the high rock off it (night is of course here supposed). Steering a course farther out, in anything like hazy weather, throws you into some doubt as to when you are off the cape, and causes an increase of distance and loss of time inconsistent with steam navigation. Passed the cape (as close as you like), a S.S.E. course, for 3 miles, takes you round Cape Sagres, which may also be passed very close; and S.E. by E., 130 miles, direct for Cadiz. But it should be observed, that the passage from Cape St. Vincent to the east is influenced by the tides and currents, the set of which no one pretends to understand, and therefore great caution is necessary, the above course having taken me considerably both to the north and south of Cadiz, without any apparent cause. In going into Cadiz in the night, great care is necessary, as no pilot will be obtained; the north shore being light reddish-coloured cliffs, and Cadiz itself showing quite black, creates a deception of vision; the lead is no guide, and a great chance is, that a stranger, when he fancies himself in mid-channel, will be well over on the Cadiz side. Therefore the safe way is to borrow well over to Rota, which town will be readily seen on any night that a vessel should attempt going in. Bring it in such a position as will enable you to pass it, at from $1\frac{1}{4}$ to 2 miles, steering E.S.E.; observe when the light bears South (the light is South, a little westerly, about $5\frac{1}{4}$ miles from Rota), right a-head will then be the Castle of Catalina, which will be seen at the termination of the light-coloured cliffs. If you are in mid-channel, this castle will be about a point on the port bow, the ship's head E.S.E., and you should not be farther to the south, than you have it in this last position, which if you are in, continue your course; if more to the north, and it appears right a-head, steer S.E. by S. for about $1\frac{1}{4}$ mile, which will bring the light to bear S.W. by S., then you will almost certainly see the men-of-war at anchor, and may steer for the outermost, or S.S.E. if you should not see them, which course, in about 2 miles, will shut in the light; and the usual anchorage off the town for small vessels will be S.W., about one mile. This proceeding will, however, take you right over the Diamante, and is, therefore, only fit for vessels not drawing 12 feet, and smooth water, the state of tide considered; but it will effectually clear you of the more northerly shoal, the Galera, on which there is much less water. The Diamante may, however, be avoided, by a course a point more south, if you are sure of your position when the light bears South. Such a course will carry you towards the Puercas, which will, however, be seen on a clear night, except during very high tides, and perfectly smooth water, (in which circumstances you may pass over the Diamante). If obliged to run in during a heavy west gale, steer for Puercas immediately you see them (always supposing you have obtained the right position between Rota and the lighthouse); the sea, in such weather, will be seen breaking heavily on all the dangers in the bay. The channel between the Puercas and the Diamante is more than a mile wide. Perhaps, for a perfect stranger to enter during the night, a more safe course is to steer along the north shore, right up to the Castle of Catalina; when the light bears W.S.W., you are clear within all the dangers, and can steer down to the anchorage about S.S.W. In heavy gales from the West, or S.W., no one should go in during the night, if possible to keep out, not

even those the best acquainted; for in such weather, even if moonlight, you cannot depend upon it being clear for 5 minutes."

TIDES.—It is high water in Cadiz Bay, at 2h. P.M., on the days of full and change, and the tide rises 10 feet; on the next days following it rises 11; but neap tides rise only 6 feet. In the space between the Frayle and the Cochinos, the ebb tide runs strongly through the channels between the shoals, and the flood tide, on the contrary, sets toward them.

CADIZ TO CAPE TRAFALGAR.—From Cadiz to Cape Trafalgar the shore runs southerly, having many rocks which lie scattered about, and are extremely dangerous. In sailing round the Isle of Leon, give the land a good berth, and keep the Tower or Lighthouse of St. Sebastian wide open of the Town of Rota, or bring the lantern to bear N.N.E., by which you clear the rocks which lie about S. $\frac{1}{4}$ E. from it, distant one mile. Farther on, bearing S.S.W. (South true), two and one-fifth mile, from the lighthouse, is a shoal spot with only 13 feet over it at low water. From this spot the Morro or Hill of Xeres, appears in a line with a remarkable church having three towers, situated nearly half a mile to the southward of the land-port of Cadiz. To avoid it keep the Lighthouse of St. Sebastian, a point or more to the eastward of N.N.E. The reefs to the southward will be avoided by taking care not to bring the Lighthouse of St. Sebastian and the Town of Rota in one, or rather, by keeping Rota open to the left of the Point of St. Sebastian.

The Torre Gorda, or Tower of Hercules, stands S. by E. $\frac{1}{4}$ E. (S. E. $\frac{1}{4}$ S. true) from the lighthouse of St. Sebastian, distant 5 miles; the coast between, being a very low beach with rocks along it, is named the Arrecife or Reef of Cadiz.

The Islet Sancti Petri, lying at the entrance of the river which bears the same name, is $5\frac{1}{4}$ miles nearly south from the Torre Gorda. The coast as above, is a low flat beach, with detached rocks and stones. The islet is surrounded with rocks, and has on it a castle with a square tower; within it the river has two entrances, but both are too much obstructed by rocks to allow the admission of any vessels larger than fishing-boats and small coasters, as the sea breaks violently over them during a swell.

A round tower, named Torre Bermeja, or the Red Tower, is S.E. by E. $\frac{1}{4}$ E. from Sancti Petri, distant nearly four miles; it stands near the beach, at the east end of a portion of coast of a red colour, level on the top and steep towards the water, but a little higher than the land to the westward of it, and covered with fir trees. Another round tower named Barossa, stands on a height, at the distance of a mile and three-fifths to the southward from the former. The coast between is the flat beach of Barrosa. To the north-westward of the tower is the little hill named La Cabeza del Puerco (the Pigs Head) which serves to point out the situation of several shoals hereabout.

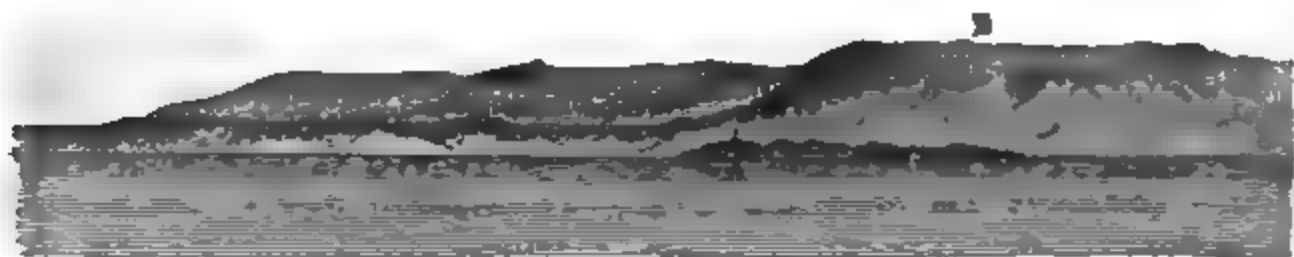
Cape Roche, at $2\frac{1}{4}$ miles from the Tower of Barrosa, has on it a square tower; this cape is not high but steep to seaward, and of a red colour, by which it may readily be known; some rocky precipices near the cape are named the Castelligos or Little Castles. Close under the eastern side of Cape Roche is a small beach, with a little river; the eastern point of this flat beach, named Espileta, is rocky, and is useful as a mark for some of the shoals in the offing hereafter described.

The Watch Tower of Conil, which stands within the distance of one league S.E. $\frac{1}{4}$ S., is square, and stands on a height a little to the westward of the Town of Conil. In a hight between these towers, at a mile from the latter, *are the remains of a tower named Torre Blanca*; and below this, close to the *shore, are three large rocks, lying in a line athwart the land.* The top of this

coast is even, its face steep, and a little higher than Cape Roche, with a sandy beach and a few rocky points. The little river of Conil admits small vessels at high water, but they lie dry when the tide is out.

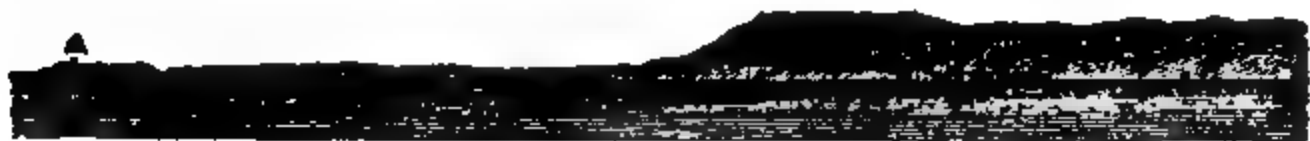
The Tower of Castilobo is square, and stands at a mile and a half southward of that of Conil; the beach on which it is placed is very flat, but the interior land is hilly.

CAPE TRAFALGAR is five miles to the southward of the Tower of Castilobo, and is situated in lat. $36^{\circ} 10' 16''$ N. and long. $6^{\circ} 1' 30''$ W. It is not high but may be known by its remarkable figure, being flat and terminating with two sharp corners or angles. A round tower stands on the eastern corner. To the eastward of the flat the land is very uneven and mountainous. East of the flat land are high sandy cliffs, but none to the westward. Between the cape and Castilobo the coast is low and sandy, except a few rocky points equally low with the rest, and of which one extends outward to the distance of more than a cable's length.



A. Cape Trafalgar, E. 84° N. (true), about one mile. B. Heights of Meca.

The Altos, or Heights of Meca, to the north-eastward of Cape Trafalgar, are very level on the summit, and appear to be divided into two parts, spotted with green clumps, and a few patches of white sand.



A. Cape Trafalgar, N. 33° W., distant 2 leagues.

The following remarks were written by Mr Adams, an intelligent master-mariner, by whom they have been most obligingly communicated.

"Cape Trafalgar is low, and stretches out a considerable distance from the rising land; the cape itself is a little higher than the land inside it, and is steep towards the sea. There is a square tower upon it, and when bearing in a north-easterly direction, at the distance of 4 or 5 miles, it appears to be placed upon a small rocky hill which intercepts the line of low sandy shore, from which the tower on the Heights of Meca bears E. by N. The cape is easily recognised in a north-easterly direction, and when first seen, will appear like a small detached island with a tower on the middle of it, but in passing it at the distance of 7 or 8 miles, neither the cape or the low sandy shore will be seen, nor will the tower be easily distinguish, as it will be in a line with the high land in the country.

The Altos, or Heights of Meca, is the first high land near the coast, to the south-eastward of Cadiz; it has a high round white tower on the N.W. corner, the highest part. The Altos are flat, and decline a little in a south-easterly direction to the Point of Meca, which is perpendicular from the sea, and of a moderate height, with a round tower upon it, distant about $2\frac{1}{2}$ miles

from the tower on the Altos. The Point of Meca and the land for about a mile to the north-westward of it appear of a white colour."

These are the observations of Mr. Adams, and he adds that the description of Cape Trafalgar in all the Direction Books in his possession, applies to the Heights of Meca, and the round tower represented to be on the eastern corner of the cape, is none other than the tower on the Heights of Meca.

At three miles to the S.E. by E. $\frac{1}{4}$ E. of Cape Trafalgar is the Tower of Meca. Between is a patch of sand named the Boqueron, useful as a mark for the shoals in the offing. Nearly a mile E. by S. from the Tower of Cape Trafalgar, the beach is low, and has a small creek with some rocks lying before it; this is named the Barcadero of Meca, and here water may be obtained. Vessels may anchor off this place, in a convenient depth, on clear ground, sheltered from N.W., North, and N.E. winds.

SHOALS BETWEEN SANCTI PETRI AND CAPE TRAFALGAR.—The Juan Vela is a large rock lying at the distance of three miles, W. $\frac{1}{4}$ S., from the Castle of Sancti Petri; the depth over it is $2\frac{1}{2}$ fathoms.

The Haste Afuera or the Outer Haste, lies 3 miles, S.W. by W., from Sancti Petri, and $5\frac{1}{2}$ miles, N.W. $\frac{1}{4}$ W. from Cape Roche. It is a rocky shoal of 3 fathoms, and near it on the outside are from 14 to 10 fathoms. Large ships should pass at a considerable distance from, and smaller vessels should not come near this shoal, for the sea rolls heavy and breaks over it with a swell.

The Marrajotes is a rocky shoal, about half a league in length, in a S.E. by S., and N.W. by N. direction, in the middle part of which the depth varies from 2 to 4 fathoms. Its N.W. point lies S.S.W., $2\frac{3}{4}$ miles from Sancti Petri, and N.W., $3\frac{1}{4}$ miles, from Cape Roche. Its S.E. point lies S. $\frac{1}{4}$ W., nearly four miles, from Sancti Petri, and N.W. by W., 2 miles, from Cape Roche. On the extremities are $4\frac{1}{2}$ fathoms, and the sea generally breaks over them. To pass between this reef and the land, keep the Town of Conil shut in with Cape Roche.

The Shoal of Cape Roche is a rocky shoal, having over it only $1\frac{1}{2}$ fathom at low water. It lies at the distance of a mile, W. by N., from Cape Roche. Its extent is half a mile N. and S. by compass.

The Shoal of Conil is another rocky shoal, lying at the distance of one mile and a half from shore, and its least depth appears to be 2 fathoms, varying to $4\frac{1}{2}$ fathoms. Its north end lies with the look-out of Conil N.E. $\frac{1}{4}$ N., distant $2\frac{1}{2}$ miles, and the Tower of Castilobo E.N.E. $\frac{1}{4}$ E., one mile and three-quarters. The shoal is about a mile long, nearly parallel with the shore, and from its shoalest part, the Tower of Castilobo is in a line with a little hill of no great height, on the eastern side of which is the Cabeza del More, or Moor's Head, on the Mountains of Ronda, with Medina bearing N.E. $\frac{1}{4}$ E.

Bank off Cape Trafalgar.—This bank extends one mile and a half, N.N.W. and S.S.E., and lies at the distance of between 3 and 4 miles from the cape. Its least depth is 3 fathoms, but around it are from 8 to 10 fathoms, at a short distance. The N.W. end bears N.W. by W. $\frac{1}{4}$ W, $3\frac{1}{4}$ miles, from Cape Trafalgar; and here the tower on that cape appears in a line with the Tower of Meca, while the tower on Cape Roche is in a line with the Cabeza del Puerco, already described. The S.W. end bears W. $\frac{1}{4}$ N., $2\frac{1}{2}$ miles, from Cape Trafalgar: and S.S.W. from the Tower of Conil. From this end the Tower of Trafalgar appears in a line with the sandy spot named the Boqueron.

The Shoal of Aceytera is a reef of rocks extending North and South, *about one mile, and about two cables' length in breadth.* The least depth is *$1\frac{1}{2}$ fathom at low water; but in the intervals between the rocks there is as*

much as 5 fathoms. The N.W. end lies W.N.W. $\frac{3}{4}$ W. nearly 2 miles from Cape Trafalgar; and the S.E. end W.S.W. $\frac{3}{4}$ W. at about the same distance from that cape. On the north end the Tower of Trafalgar is in one with the Boqueron; on its shoalest part, the same tower is in a line with the highest point of the high land of Meca. Between the Shoal of Aceytera and Cape Trafalgar, in an extent of half a mile there seems to be a boiling in the water, with the appearance of breakers. This is merely the effect of the counter-currents, there being no danger, and it is, therefore, called the Risa, or Laughter of the cape.

In passing without, or on the outside of these shoals, it will be sufficient to give the land, all along, an offing of one league and a half; and thus you may run along with safety, in from 17 to 14 fathoms; due allowance must of course be made for westerly and south-westerly winds. Within the shoals there is a clear channel of half a league in breadth, excepting off Cape Roche, where it does not exceed a mile: any ship may use it, as the least depth close to the shoals or land, is $5\frac{1}{2}$ fathoms, and in the middle the depth is generally from 11 to 9 fathoms, bottom of sand, gravel, and rock. If requisite to pass through this channel from the southward, the best way is to keep within half a mile of Cape Trafalgar, and at about the same distance from shore, all the way thence to Sancti Petri, where you must stand off until you bring the light-tower of St. Sebastian, N.E. by N. so as to avoid the reef already described, which lies two and one-fifth miles, S.S.W., from St. Sebastian's Point.

Having entered the channel between the shoals and land, you may easily stand out to sea should this be required; only taking care to observe the bearings of the land and attending to the state of the tides, noting that the flood sets very strong to the north-westward, and the ebb in the contrary direction. During a heavy swell, with wind unsteady, it would be imprudent to attempt a passage between Cape Trafalgar and the Shoal of Aceytera, as here the sea rolls deeply, and should the wind fail, you may be obliged to come to an anchor in an exposed situation and on bad ground.

At four miles and a half from the Tower of Meca is the Point of Sara; between is the cove and river of Barbate, where there is clear anchorage, but the river is narrow and shallow. Sara Point is moderately high near the sea, being the extremity of a mountain, having two towers and other buildings on its summit. Cape Camarinhal is low, having a watch-tower erected on it, and rocks scattered about its point; it forms the east point of Sara Bay, where, in moderate weather, small vessels may ride securely enough. Cape Plata is the extremity of another mountain, with several rocks about it.

To the S.E. $\frac{1}{2}$ E., $4\frac{1}{2}$ miles, are the Point and Tower* of Palomas, having several rocks before it; between is the Bay or Cove of Balonia, where there is good anchorage and shelter half a cannon-shot from the shore. About $3\frac{1}{2}$ miles from Palomas Point is that of La Pena, having a tower erected on it: between is the Bay of Valdebaqueros, which affords shelter for small vessels. At four miles from La Pena is the Chapel of St. Catalina, with the Town of Tarifa, and about two-thirds of a mile farther is the island of the same name.

TARIFA, which was formerly an island, is now connected to the main by a narrow causeway. It is small and low, and distinguished by a lighthouse, which exhibits a light revolving in $2\frac{1}{2}$ minutes. The channel on the north side is only a cable's length in breadth, and has but a depth of 8 feet at low water; the water, however, outside is deep. The Marroquina Rock lies on

* We are informed that this tower does not now exist.

the S.W. side, distant half a musket-shot from the shore, and is sometimes covered : there are some shallows also on the western side, but the island is otherwise clean all round.

The Cabezos Shoals lie with the Lighthouse of Tarifa bearing S.E. $\frac{1}{4}$ E., about 5 miles distant, and Paloma Tower N. ; they are about a mile in length, stretching in a S.E. and N.W. direction, having only 2 feet over them at low water ; but at a short distance are 2 and 3, and a little farther on 8 and 10 fathoms. To avoid these dangers bring the low sand-hills to the eastward of Meca, by Cape Plata, taking care in standing to the northward, that they do not become covered by the cape until the Chapel of Luz is open of the east end of the Sierra de Eumedia ; but keep at a proper distance from the shore, as there is a rock lying between the Cabezos and Point Pena, named La Peidra de Valdebaqueros, having but 2 fathoms on it, and 4 to 6 fathoms near it : this rock lies W.S.W. from the Tower of Pena, distant $1\frac{1}{2}$ mile, and N.W. by N. from the Island of Tarifa, distant 4 miles ; between this rock and the tower on Pena Point there is a channel above a mile broad, having in the middle 8 and 10 fathoms, sandy bottom ; to sail through it, bring Paloma Point in one with Cape Plata. W.S.W. of the Cabezos, distant three-quarters of a mile, is a new bank of 7 or 8 fathoms, running W.N.W. $\frac{1}{4}$ N. and E.S.E. $\frac{1}{4}$ S., and between these and the Cabezos are 11 and 7 fathoms. Westerly winds frequently form a whirlpool between it and the shore.

Half a mile N.W. of the Cabezos, and about two and a half miles from Point Paloma, lies the shoal of Arroya del Puerco, a narrow ledge of rocks about one mile in extent, with a depth over it of 3 fathoms at three-quarters flood ; between the shoal and the land are 14 to 18 fathoms, and between it and the western part of the Cabezos, 8 to 12 fathoms. With westerly winds, there is a whirlpool between this ledge and the land. The Thisbe Rock, on which H.M. Frigate "Thisbe" struck in August, 1804, is a reef lying S. by W. $\frac{1}{4}$ W., distant about 5 miles, from Paloma Tower, and W.N.W. $\frac{1}{4}$ W., $5\frac{1}{2}$ miles, from Tarifa Island : it is represented to have only 14 feet water upon it, but much doubt exists as to its position, and it has been supposed that the vessel must have struck on the Cabezos. Tarifa Lighthouse E. $\frac{1}{4}$ S. leads clear to the southward of this shoal.

East of St. Catalina is Camorro Point, which is high, broad, and steep, with rocks about it. Between the island and the town of Tarifa, small vessels may be sheltered from westerly winds, and, in fine weather, large vessels may anchor to the eastward of the island, opposite the sea-gate of the town, in from 15 to 18 fathoms.

Point Gualmesi, which lies nearly 5 miles to the eastward of Tarifa Lighthouse, is high and precipitous, with a watch-tower on its summit, and a small cove on its eastern side ; $2\frac{1}{2}$ miles farther is the eastern point of Azebuche, the western point of which is a little within to the westward ; both are surrounded with rocks, some of which are above water, but not far without the land. The land between the Points of Azebuche bends in to the northward, and within it stands the Castle of Tolmo, off which there is good anchorage for small vessels, and shelter from northerly winds, in from 8 to 6 fathoms, good holding-ground.

One mile beyond Point Azebuche is Point del Frayle. The land is very high, but slopes to the sea, and on its summit is a watch-tower. Close to the point is an islet, which, in appearance, is said to resemble a friar, and has several rocks about it. On the east side of the point is a small sandy cove, fit only for small vessels, and sheltered from the north-westerly winds, *with a castle for the defence of the anchorage.*

Cape Carnero, or Cabrito Point, lies about two miles to the north-eastward

of Punta Frayle, and within it, on the S.W., is Palomas, or Pigeon Island, distant about three-quarters of a mile from the watch-tower of Point Carnero. The island is low and rugged; off its N.W. part are the two Cabrita Islands, and one and a half cable's length farther west, is a cluster of small rocks, some above and others under water.

The Pearl Rock lies about one and a half mile to the southward of Palomas Island; it has not more than 9 or 10 feet water on its shoalest part, but at two ships' length from it, it is surrounded by 7 to 9 fathoms. The mark for the shoalest part is Pigeon or Palomas Island, in one with the third rising from Carnero Point; a peaked rock off the same point in one with a hill like a sugar loaf, with a small saddle on the top of it, which stands to the eastward of St. Roque; and the tower on Point Frayle W.N.W. The channel between this rock and Palomas Island may be used with a leading wind, taking care to give the island a berth of $1\frac{1}{2}$ cable's length: in this passage are 7, 8, and 9 fathoms water. In coming from the westward, you will have passed the Pearl, when you perceive the Town of St. Roque (which is readily known, being seated on the top of a small hill) over the rocks of Carnero Point, or when that point bears N. by E. you may run in for the Bay of Gibraltar, giving the port land a good berth, until you open the Devil's Tower, towards which you may steer and anchor in any depth from 20 to 5 fathoms.

NOTE.—In going through the Straits of Gibraltar, masters of vessels cannot be too careful to keep clear of the two dangerous sunken rocks Cabezos, described, page 110, also of the Pearl Rock; several vessels having been lately lost upon them.

BAY OF GIBRALTAR.—At two miles, N. by E. $\frac{1}{2}$ E., from Cabrita Point, which may be considered the western boundary of the Bay of Gibraltar, are the broad Point and Tower of St. Garcia; the Bay or Cove of Getares lies between, having deep water and good ground, except towards the rocky points, but it is entirely open to easterly winds, which send in a heavy swell. Some rivulets are at the bottom of this bay, with a considerable quantity of water in winter time.

The coast from hence to the northward presents numerous rocks, surrounded by which is the Island of Algeciras, named also Verde, or Green Island, being moderately high and well fortified; this island, and the channel between it and the land, is exceedingly dangerous, and only fit for small craft. The Mole of Algeciras is distant about half a mile from Green Island, to the southward of which is the River Miel, into which small vessels go at high water. Half a cable's length east from the Mole is the Galera Rock, which lies even with the water's edge, and has a reef on its N.E. side. Another shoal and some rocks lie also off the town.

Algeciras was formerly a port of some importance, but has latterly been on the decline: a fort named St. Antonio stands on the north end of the town, and three-quarters of a mile from that is the Tower of Almiranta, situate on a point of moderate height, surrounded with rocks.

At about $2\frac{1}{2}$ miles to the northward of Green Island is the bar of the River Palmonies, resorted to in winter by the trading vessels of Algeciras. Punta Mala on the east side of the bay, opposite Palmonies River, is rather elevated, having a castle erected upon it, and situate about $1\frac{1}{2}$ mile north-westward of Fort St. Philip, which stands at the west end of the Spanish lines; a ledge of rocks extends to the S.W. two cables' length from Punta Mala, some of which are above water. N. by E. nearly from Point Mala Castle, distant about three-tenths of a mile, is the Hospital de la Sangre.

GIBRALTAR.—*The Spanish lines extend across the peninsula, and terminate*

at Fort St. Barbara; the land is low and flat all the way to the rock of Gibraltar, where it suddenly rises to a great height, its top being uneven, with several eminences thereon, and extending southerly until it slopes down to Europa Point, the eastern point or boundary of the Straits of Gibraltar. The Rock of Gibraltar, is cut down on the eastern side perpendicularly, but on the west side is a kind of plain, where the town is built. From the north end of the town the Old Mole extends in a N.W. by N. direction, 1,000 feet; the New Mole, at a mile and a half to the southward, extends 700 feet to the N.N.W., forming an elbow where even ships of war may ride in 5 and 6 fathoms.

Upon Europa Point a lighthouse is erected, exhibiting a fixed light, at an elevation of about 150 feet, visible 15 miles. On the 25th of April, 1843, an additional section of the range of light was opened, which renders it visible from Sandy Bay, on the Algeciras coast, to the mouth of the River Palmonies.

On the western side of Gibraltar Bay, a vessel may come to an anchor at half a mile from Cabrita Point, in from 18 to 27 fathoms, fine gravel and sand, or from thence out to 38 fathoms, good holding-ground. The same depths will be found towards St. Garcia, but here the ground is not so good. The best and most secure anchorage, however, is from the centre of the Town of Algeciras, towards the River Palmones, and over towards the bridge of Mayorga; the limit commences when you have passed the line on which Cabrita Point appears in one with Apès Hill in Africa, and Galera Rock in one with the south end of Algeciras. The best station is to the northward towards the Palmones, or more to the eastward at half a mile from the shore. It is requisite to sound ere you drop your anchor, as the water may be too deep.

Vessels may also ride all the way from the Bridge of Mayorga towards St. Philip's Castle (keeping off from Mala Point), but between the Castle and Old Mole the anchorage is to be preferred, as there is less depth of water; this is the usual anchorage of English vessels, the smaller ones lying near the Mole, and the larger farther out. Also in the space between the Old and New Mole, vessels likewise anchor in any depth they please, keeping not less than half a mile off, as there are rocks along shore, nor farther off unless you get into too deep water. Vessels may also ride between the New Mole and Europa Point, keeping half a mile from shore, but the water becomes somewhat deeper. A pinnacle rock is said to be 300 yards to the north-eastward of Europa Point; it is of small dimensions, but there is sufficient water for a man-of-war to pass between it and the shore.

TIDES.—In Gibraltar Bay the tides rise 5 and 6 feet; it is high water, full and change, at 10h.

SECTION II.

THE COAST OF AFRICA.

CAPE SPARTEL TO THE EQUATOR.

Along the north-western shore of Africa there are but few places capable of *affording* shelter for ships, the whole coast being open and exposed. The *soundings in general* extend 20 miles from the land, at which distance are 80 to 100 fathoms, and are immediately succeeded by deep water.

CAPE SPARTEL, the north-western point of Africa, is so high as to be seen, in clear weather, at the distance of 40 to 50 miles, and appears, when first seen, like an island, but a nearer approach brings into view several small hummocks on its western ridge. The high land is said to resemble the awning of a galley. The ground about the cape is quite clear, with the exception of some high rocks, which are steep-to. At the distance of 2 miles from the shore are 98 fathoms, the bank immediately dropping to an unfathomable depth. To the southward of the cape, the bank extends much farther off, and there is excellent anchorage on a bottom of mud and sand, with shelter from easterly winds.

Tangier Bay.—Although this bay is not on the western coast of Africa, but on the northern, within the Strait of Gibraltar; yet, as ships occasionally run into it for shelter and provisions, a short description may not be unacceptable. It is distant about $5\frac{1}{4}$ miles to the eastward of Cape Spartel, the coast between being high and clean, with the exception of the rocks close to the shore. In it there is convenient anchorage in 8 to 10 fathoms, but caution is required to avoid the Zandovin Ledge, a rocky shoal on the eastern side of the bay, bearing S.E. by E. $\frac{1}{4}$ E from Tangier Point, and S.W. by W. $\frac{1}{4}$ W. from Cape Malabata; the latter cape at the same time being nearly in a line with Europa Point. Gibraltar leads clear of it, so that it will be proper to anchor with Gibraltar open of the cape. Moor to the N.W. and S.E. with the longest cable to the N.W. Implicit obedience should here be observed to the advice given by the consul, in your intercourse with the natives. About three-quarters of a mile distant, N. by W. $\frac{1}{4}$ W., from Cape Malabata is the Almirante, a rock of 3 fathoms; and there is also a sunken rock about the same distance from Tangier Point, which lies with the inner coast of Tangier S. by W. (S. by E.)

From Cape Spartel, the direction of the coast is S.W. for 20 miles to Arzila, a small fortified town, situated close to the shore, between which and Cape Spartel there is good anchorage all along the shore, with an easterly wind. The depths of water are regular, as you will have from 10 to 15 fathoms, from 1 to 2 miles off shore, on a sandy bottom: the coast line is a flat sandy and shingly beach, rising to a fine grazing country in the interior. Near Cape Spartel is the road of Jeremias, which extends from it 8 or 10 miles to the S.W.

In 1838 H.M.S. Dido anchored near Arzila, in smooth water, and well sheltered from a strong Levanter in the following positions:—1st anchorage, in 15 fathoms, sand and shells—Cape Spartel. N.E. $\frac{1}{4}$ N.; Town of Arzila, S. by W. $\frac{1}{4}$ W.; and extremity of land to the right, two points nearly in a line, S.W. by S. From this anchorage to the nearest shore was about $1\frac{1}{4}$ mile; soundings very regular to a depth of 5 fathoms, which was two cables' length from the shore. 2nd anchorage, in 13 fathoms, coral rock, gravel, and sand—Cape Spartel, N.E. $\frac{1}{4}$ N.; centre of the Town of Arzila, S. $\frac{1}{4}$ E.; and two bold and prominent points to the S.W. of the town, nearly in a line, S.S.W. $\frac{1}{4}$ W.

Nearly midway between Cape Spartel and Arzila is the village of Almadrones, near to which a landing may be effected.* At 4 or 5 miles to the

* It would appear from the following that there cannot be too much caution in landing here:—“One of our boats (H.M.S. Dido, March, 1838), sounding in this vicinity, landed, and on two officers and two seamen, part of the boat's crew, walking not more than a hundred yards from the beach, in hopes of procuring stock, (numerous heads of cattle grazing in the vicinity) they were immediately seized by a party of Moors; three were detained and conveyed into the country, the fourth person having effected his escape. The ship, then lying at her first anchorage, was soon under way and run down off Arzila, demanding from the governor the officer and men detained. A party of Moorish horsemen were now sent to scour the country, who found them on their road to Tangier under a guard;

N.E. of Arzila is a small river, named the Wad el Ayasha, which is barred across the entrance, but flows sufficiently strong to afford a good supply of water; it is convenient also, as the distance to roll the casks (the boat being anchored clear of surf) is not above 50 yards.

From Arzila the coast trends S.W. $\frac{1}{2}$ W., and is easily distinguished by a remarkable white cliff which is seen nearly 15 miles off; but the best mark for the coast is the Jebel Sarsar, an insulated mountain resembling a sugar-loaf, which stands S. by E. $\frac{1}{2}$ E. from the entrance of El Araish. The Town of El Araish stands on the river El Khos, and will be known, when approaching it, by a large castle and batteries. The best anchorage is with the town between the South and S.S.E. The mouth of the river, which appears very broad, is really very narrow at low water, and has then only 5 and 6 feet water over it, but there is a rise and fall of 9 to 12 feet. Inside, the water deepens to 24 feet. A pap or rising spot, on the north side of the river, is 200 feet high above the sea. The best anchorage in the roads, for vessels intending to enter the river, is with the distant conical mountain Jebel Sarsar, appearing in the centre of the entrance, one mile from the point, in 12 fathoms sand. Supplies are abundant, and there is a fine spring of water on the northern shore, very convenient for shipping.

Between Arzila and El Araish, the ground is tolerably clean, but not very good, being coarse gravel, with 25 and 30 fathoms of water, at from 1 to 3 miles from shore. Before El Araish the depth decreases, and there are only 4 fathoms at 2 cables' length from shore. In sailing along this coast, you must not advance too near, unless it be with a strong easterly wind, for often, in calm weather, there is a heavy swell from the West or N.W., which may render it difficult to get off shore.

The Jebel Sarsar, or Peak of Fas, above-mentioned, serves as a mark for the old town of Mamora, from which it bears nearly true East. The site of Old Mamora, known by several white-washed tombs, the chief of which is that of Moulai. Abow Salloum, is situated at the outlet of a stream, which is said to flow from a small lake, 20 miles to the southward of El Araish. At 2 cables' length from the bar is a depth of 5 fathoms, gradually increasing to 34 fathoms, at 2 miles from shore. The coast between El Araish and this spot is straight, and for the most part upwards of 250 feet in height; reddish cliffs for the first 10 miles, then sand-hills, partly covered with brushwood. There are everywhere from 20 to 25 fathoms of water, at half a league from shore, and you may anchor off the coast as far to the southward as Sla, or Salee. Ships sometimes anchor here, during a calm, to avoid being drifted by the currents, which set to the southward, along the coast; and the velocity of which, especially at the full and change of the moon, is frequently from 1 to 2 miles an hour.

on this they were escorted back to Arzila, but were refused to be delivered up until permission was granted by the Governor of Tangier. The delays were so protracted that we anchored (to make a serious demonstration) off the town, in $4\frac{1}{2}$ fathoms water, at about 600 yards distant from the shore, and 150 yards outside a reef of rocks, awash, which describe a semicircle without the beach line, (affording a good shelter under its lee) the principal fortress bearing S. $\frac{1}{2}$ W. The next day we received our people, by permission of the authorities of Tangier, and started from their inhospitable shore.

"To account for the foregoing proceedings, it appears, by a treaty, that trading is forbidden at any port on the Moorish coast, at which there is not a British consul, or his agent. At Arzila there is a Spanish Jew, in the latter capacity, who behaved uncommonly well on this occasion. Now as we landed only 5 miles from an authorised port, it appears they carried this article of the treaty to its fullest extent. In fact it is generally attended with fatal consequences for a Frank to land on an unauthorised part, on any pretence, whether from distress, or a want of knowledge of their customs. As a proof of the general ignorance of this custom, we had on board, at the time of the above incident, five merchant captains, who had been in the habit of trading to the S.W. ports of Marocco, who knew not that landing was against their laws; and it is only to be regretted that our consuls in Marocco do not give more general information on so serious a point."

From hence, the coast extends 10 leagues, S.S.W., to Mehediyah. The coast is very clear, and readily known, being of white sand, as far as about the middle of its declivity, while the upper part appears like cliffs. The river Sebou, on the south bank of which the town is situated, is impassable, except in boats, or on rafts, at some distance from the sea, although navigable near the ocean. Here vessels may anchor half a league from shore, in 12 or 14 fathoms, sandy ground, with the town bearing from S.E. by E. to S.E. by S. All along this coast the swell is sometimes excessive on the shore, which, with the S.W. winds, renders it very dangerous.

Between Mehediyah and Sla, or Salee, the coast is rather low, and may readily be known by its white sandy strand. About half-way, the strand rises, and thence, southward, the shore consists of black and steep rugged rocks, with small hills. Sla, with the Town of Rabat, is situated on the river Abou Rakrak; the latter town is rendered remarkable by the high tower of Beni Hassan, which may be discerned, in fine weather, 20 miles off. It is built of hewn stone, is 180 feet in height, and 35 or 36 feet broad. At a small distance to the northward of it, are the ruins of an ancient wall, on which were formerly a battery and castle. There is a bar across the river, rendering it only navigable for small vessels; but it is said that there is good anchorage between the mosque and the tower, for ships of every burthen, which, however, can only be considered safe from March to the latter end of August. Many anchors have here been lost, so that attention must be paid to the cables.

At about 7 miles to the W.S.W. of Rabat is the Massa Tower, similar in appearance to those frequently met with on the coast of Spain, and which was in former times, without doubt, of great service to the Sla pirates when making the land. Nearly 27 miles beyond this is the small peninsula of Fedalah, which is sometimes mistaken for an island; it affords indifferent shelter to small vessels during westerly winds. A roadstead here is supposed to be the only one, with the exception of Agadir, in the parallel of $30^{\circ} 27'$, wherein ships on the coast may ride in security during winter. This is owing to a projection of the land, south of the peninsula above-mentioned. Between Rabat and Point Fedalah, there is no danger beyond a quarter of a mile from shore; and the bank of soundings extends to the distance of 20 to 22 miles from the land, increasing south-westward. About one league from the shore, there is a depth of 20 to 30 fathoms, rocky ground; it then becomes sandy, increasing to 60 and 100 fathoms.

At 4 leagues W. by S. from Fedalah, is Dar-el-Beida, a small walled town on the beach, within a point projecting half a mile N.N.E., true, and forming a cove, three-quarters of a mile deep, and well sheltered from westerly winds. This place is easily known by its towers, one of which seems almost as high as Hassan's Tower, at Sla. The coast between is low, and bordered with small islets, all very near the land. A reef of rocks lies at one-third of a mile off the town, and the landing-place is behind them. Some other parts of the bottom are likewise rocky, and in winter the anchorage is unsafe, owing to the current, &c. From the cape, rocks extend to the distance of nearly half a mile; and farther off, is a rocky bank of 6 fathoms. At 20 miles to the west, is a depth of 150 fathoms, dark sand, decreasing rapidly toward the land, to 45 fathoms, at 12 miles from shore, and then gradually to the beach.

At about 13 leagues to the south-westward of Dar-el-Beida, is the small town of Azamor, standing on the river Om-er-biyeh, but it affords no safe anchorage. At 3 leagues farther, are the remains of Mazaghan, which are situated on a low rocky point, projecting to the north, and forming the western limit of a sandy cove, of about $1\frac{1}{4}$ mile in extent, in which there is a good

roadstead for small vessels. It is defended by several redoubts, enjoys a little commerce, excellent water, and good supplies. There is anchorage off the coast, at one league from the shore, in 15 fathoms, clear sandy ground; but at the west point of Mazaghan, is a ledge of rocks, which stretch to the N.E. (N.N.E.) about a league into the sea, and are uncovered at low water.

The shore from Mazaghan to Cape Blanco (north) is rocky and dangerous to some extent, and ships stopping here must anchor at two leagues off, in 35 or 36 fathoms of water, oozy ground; the swell is almost always very great, and the currents very strong.



Mazaghan bearing South, distant 9 or 10 miles.

From Mazaghan to Cape Blanco, the distance is 4 leagues; midway, are the ruins of Tett, an ancient town, and a conspicuous tower, 128 feet high, and 148 feet above the sea, which may therefore be seen from a great distance. Two large tombs, kept white-washed, stand on either side of it. The coast hereabout should not be approached nearer than a mile and a half, as scattered rocks lie off the shore, and the bottom is very uneven. The beach, in some places, sandy, is generally lined with craggy rocks. A line of barren hills, 200 feet high, slope to the beach along the whole distance, and terminate just to the northward of the cape, in a low and dark, but abrupt and rocky cliff.

CAPE BLANCO, NORTH, is somewhat remarkable, by its white and red spots, and looks like a wall at a distance; safe anchorage may be found on the S.W. side. At 22 miles westward of Cape Blanco, are soundings of 150 fathoms, fine sand, gradually decreasing to 28 fathoms, at 4 miles from the shore. The coast, 6 miles south of Cape Blanco, is 465 feet high. Twenty-one miles S.W. of Cape Blanco, stands the mosque of Edor, on the summit of the land, which is about the highest between Tett and Cape Cantin.



A. Cape Blanco being E. 7° N., distant $2\frac{1}{2}$ leagues.

CAPE CANTIN.—Ten miles S.W. of Edor, is Cape Cantin, an abrupt cliffy point, about 211 feet high, which is prominent and remarkable, when seen from the N.E. or S.W. It has a building on it, and from its extremity a spit runs out about a mile. Between this cape and Edor, the coast is in many places skirted by small rocks, on one of which stands apparently a small fortress. Four miles S.W. by W. of Cape Cantin is a gravel bank, on which are 25 fathoms; and 16 miles westward from the cape, are soundings of 100 fathoms, fine sand; this depth gradually decreases eastward. From Cape Cantin to the north point of Asafi, the coast trends S.W. $\frac{1}{4}$ W., 4 leagues, and is much higher than the coast already described. Between these points, at the distance of a league from shore, are soundings of from 30 to 40 fathoms. From the north point of the bay (which is foul) to the town of Asafi, or Saffi, the distance to the S.S.E. is $2\frac{1}{2}$ leagues.

Between Cape Cantin and the Bay of Asafi, the coast is one continued

white cliff, with a sandy beach at its base; the cliff, rising gradually to its southern projection, is then 530 feet in height, and here the bay commences. In the bight within is a ravine; and on the slope stands the ancient town of Asafi, surrounded by a wall 31 feet high, with a ditch, and defended by 24 heavy guns next the sea. Fresh water is scarce, and procured from wells southward of the town. Although the road is safe in summer, yet in winter, when it blows from the S. or S.W., it cannot be considered so, being much exposed to those quarters.

If bound to Asafi from the northward, shape such a course as will lead sufficiently to the westward of Cape Cantin, in order to avoid the rocks about that cape. You may easily know on which side of Asafi you are standing, as the land to the northward of the bay is high and uneven, and that to the southward of it is a plain even land. During the summer months, or from March to October, the bay affords as good anchorage and smoother water than any other on the coast, but is entirely exposed to westerly winds; the bottom is of sand and mud, and there is generally a depth of about 15 fathoms, at a mile from shore. Vessels may anchor at a league from the town, in 20 or 22 fathoms of water, gray and oozy sand. To anchor in the road, the north point, on which stands a low tower, must be brought a little to the northward of N.N.E.; or, farther in the bay, the same point may be brought North (by compass), a little easterly, when the northernmost of two northern points will appear about a ship's length open, without the southernmost, and the high castle of the town S.E. by E. or S.E.; the depths 16 to 18 fathoms, fine gray sand. There is also anchorage within, in 15 fathoms, with the north point N.N.W., or N. by W.; but these are the summer roads. In the winter, you must anchor farther from the land, in 20 or 22 fathoms, as above-mentioned. You may boldly run in to the summer roads by night, with the castle bearing E. by S., or East.

From the south point of Asafi Bay, which is very low, to the mouth of the Wad Tensift, or River Marocco, the coast trends S.S.W. $\frac{1}{4}$ W., 16 miles, and presents generally a line of sand-hills, from 150 to 200 feet high, which, in some places, terminate in low cliffs, and in others, slope to the beach. There is a large tank on shore, nearly midway between Asafi and the Tensift; and on the southern bank of the river, is an old castellated building, square and roofless. The bar of the Tensift, although a considerable river, is in summer entirely dry at low water.

MOGADOR or **SUIRA**, the principal seaport of the the kingdom of Marocco, is distant from Asafi about 20 leagues in a S.W. direction. On approaching the land on its parallel you will observe, if the weather is clear, the distant craggy summits of Mount Atlas; while to the northward the Jebel Hadid, or Iron Mountains, will appear like a large island. On approaching nearer to the shore, a narrow white streak of sand-hills, fringed at the top with verdure, seems to rise out of the sea; and at the distance of 3 or 4 leagues the mosque towers and castles of Mogador begin to be distinctly seen, as well as its low black island. Soundings in 100 fathoms may be obtained at 22 miles from the shore, on the parallel of Mogador, when the water almost immediately becomes discoloured; and from the depth of 78 fathoms the soundings decrease gradually.

Mr F. J. Evans, R.N., of H.M.S. Dido, says, in 1838, "Mogador is but little frequented, except by the smaller description of vessels. The exports consisting principally of gum, wax, wool, and skins, are chiefly in the hands of the English and Americans. As a harbour, it merits but little praise, although the best on this coast. The harbour, or, as it is generally termed, the bay, is formed by two small bends of the coast, like a horse-shoe, protected from

the sea of the Atlantic by the small rocky Island of Mogador, situated just without the converge of the two bends. The Town of Mogador is built on the sea coast, at the northern edge of the bay. It is well defended by nature, being completely surrounded, on its sea face, by an abrupt collection of detached rocks, on which the sea generally breaks heavily, barely admitting a landing under their lee, except in very favourable weather. Its artificial defences are apparently rapidly on the decay, but it still boasts its castles and batteries, with guns mounted, and placed certainly in favourable points for defence. It would be, perhaps, difficult to estimate the number of inhabitants, but it would appear to be about 10,000, one-third of whom are Jews. The annual number of trading vessels are about 40, few exceeding 200 tons.

“ The Island of Mogador, which lies about half a mile to the S.W. of the town, is a black, barren, and uncultivated rock, about 80 feet above the level of the sea. It lies N.E. by N., and S.W. by S., (true) half a mile in length, and one-quarter of a mile in breadth, with several detached rocks on its northern, western, and southern sides: the anchorage is under its eastern shores. It is fortified and garrisoned by a small party of Moors from the town, and being used as a place of confinement for state prisoners, landing or communicating is not allowed, unless with the permission of the governor of Mogador.

“ The entrance to the bay from the northward, is between the rocky islets lying off the north end of the island, and those stretching to the southward of the town; a clear channel, of about 2 cables in width, with from 7 to 9 fathoms water. The general depths, in the centre of the bay, vary from 4 to 5 fathoms, rocky bottom, with a superficial covering of sand. The actual clear space in the central part of the bay becomes very much contracted (a quarter of a mile being the fullest space) from the flats of shoal water running off the main shore, the rocky shoals off the town, and a bar of 12 feet, at low springs, stretching from the S.E. part of the island, to the converge of the two bays before-mentioned.

“ The usual anchorage is immediately under the central part of the island, at half a cable's length from its shores, in about 15 feet, low water, loose sandy bottom. A central position in the bay is directly open to the swell of the Atlantic, which occasionally sets in, even in moderate weather, with great violence, and vessels close under the island feel its influence, with the wind from any direction,—an instance of which will be given. The bay, to the southward of the island (that is between it and Cape Sim), cannot be called an anchorage, and is only used as a point of egress, with the wind from the N.E., which blows directly into the northern bay; its depths of water agree very nearly with its northern neighbour.

“ To a stranger, there can be but little difficulty in getting to an anchorage in the harbour, with the prevalent or N.E. wind, taking the channel to the northward of the island, steering midway between the rocks, and ranging along the island's eastern shore, dropping anchor within half or a whole cable of it, rather towards its S.E. point, mooring with a small scope of cable, with open hawse, either to the northward or southward, according to the prevalent winds or season of the year. On leaving the anchorage. you will generally have to take the southern passage, running over the bar which connects the island with the main, having, in mid-channel at low water, springs, 12 feet. The following mark, for running over the bar, was communicated to me by the captain of a merchant vessel, who had used it:—The great mosque of the town, which is near the beach, on with the centre of a house having an angular roof (being the only one of that nature in the town) carries you out in mid-

channel over the bar, in 12 feet at low water springs, running out into the southern bay, until you bring an old fort, on the sea beach abreast of the island, on with a small mosque, similarly situated a little to the N.E. of it,—which mark will carry you clear out to seaward. It is necessary to observe, that the sandy bottom of the bay is extremely loose, and at times collects, as I proved, in creeping for anchors which had not been lost six weeks, and were completely buried; the harbour, notwithstanding, is not filling up, no doubt from the great under-run, after a gale.

“A considerable loss of merchant vessels took place here, in a heavy gale of wind from the S.W., in the latter end of January, 1838. They were four in number, varying in tonnage from 110 to 250 tons, lying under the island, in the berth before-mentioned, riding with three anchors ahead. The dangers of their position did not arise so much from the violence of the gale, as from the tremendous back-run of the sea, round the northern entrance of the bay, being in direct opposition to the wind. The harbour, even to the depth of 5 fathoms, was a complete mass of breakers, and greatly discoloured, from the quantities of sand washed from the shores; the whole presenting a scene, as described by the sufferers, difficult to be imagined. The consequence was, stern boats and windows were dashed in, and deck cleared; three, out of the four, drove from their anchors on the sandy beach, close to the town; and the fourth, after being thrown several times nearly on her beam-ends, from the conflicting powers of the wind on the bow, and sea on the quarter, was obliged, in the height of the gale, to slip and run on shore. Fortunately, from being driven so high on the beach, no lives were lost; but they were seriously plundered by the Moors, chiefly from the inland districts, which in a measure (by the reports of the individuals) was connived at by the Governor of Mogador, although protected by his guards.

“From the foregoing observations, it will be imprudent for vessels of a large tonnage, and a draught of water exceeding 15 feet (unless in fine summer weather) to anchor in the harbour. To vessels of a larger size, and paying a short visit, fair anchorage can be obtained outside the island; but this is open to the westward, from S.W. round to N.E. by E., and at all times there is a swell setting in from seaward. In H.M.S. Dido, we anchored in 13½ fathoms, fine sand of a dark colour, and found the anchor had very good hold, on weighing, after remaining two and a half days, and riding part of the time with a fresh breeze and much swell.

“*Bearings and Anchorage.* :—r x.* land to northward, N.E. by E.; Castles of Mogador (the governor's residence) S.E. by E.; r x. rocks off castles, S.E. ½ E.: l x. rock off island, S. by E. ¾ E.; r x. ditto, S.W. by S.; r x. land to southward, off Cape Sim, S.W. This anchorage was three-quarters of a mile off the castles. We had been informed, on anchoring, by the pilot, who came off with the British consul, that this was the best outer anchorage, but that the ground was loose. The rise and fall of tide in the bay varies in height; it generally averages from 8 to 10 feet, but occasionally has been known from 12 to 14 feet; it is also generally regular in its ebb and flow, although its direction varies with the wind, and other local causes. This question I have asked of several traders, but they are not aware of any particular direction. No doubt the flow rushes in direct from the westward, or body of the Atlantic. High water at full and change is about 4h. 30m. p.m.

“The *Currents* along the coast inshore, it is said, will be found occasionally setting to the northward, but well out in the offing, to the southward. I am induced to agree with this statement, especially the latter, having for several

* r x. and l x.—right and left extremes of land.

days found a slight set to the S.W. of a quarter of a mile per hour: it is no doubt greatly influenced by the winds, in velocity and direction. The winds along this coast generally blow from the N.E. quarter,—nine months is estimated as the average time; it has consequently received here the name of the regular trade-wind: with this wind, the atmosphere is clear, and appearance fine; winds from the southward are productive of rain and cloudy weather. The stormy months are in December, January, and February.

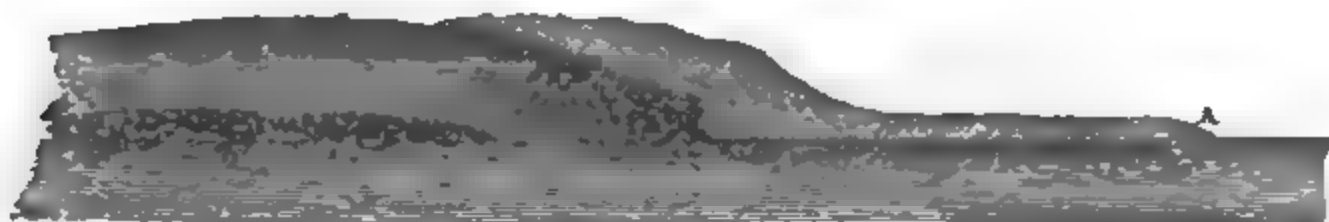
"On making Mogador from seaward, the land to the northward is rugged and high, some 15 or 20 miles, having observed it at a distance of 10 leagues. This was the range of Iron Mountains (the highest peak, 2350 feet—average height of range, 2100 feet.) On a nearer approach, as the coast line rises (which is barren and sandy, the tops of the sand-hills being alone covered with verdure), it has a misty appearance near the horizon. The town can be readily distinguished at a distance of 3 or 4 leagues, the mosque towers and castles showing out plain; as also the island, which, being a black rock, shows out boldly against the ranges of sand-hills forming the sea coast,—there being no similar feature on the coast for many leagues.

"There is only one landing-place in the harbour, which is at the foot of the castles, and named the 'Water Port,' being under a bridge connecting a rocky group of islands (on which are fortifications) with the main; its passages are intricate and difficult to be described. In moderate weather, it is tolerably easy to pull through the breakers, but in a gale, impracticable. A stranger, in pulling in, will always be guided by the bystanders on the rocks, and at the Water Port; once performed, it is easily remembered. A mark for the north-eastern passage, or one nearest the rocks, is the gate of the Water Port, kept directly open.

"Water can only be procured in very small quantities; the town is supplied by an aqueduct from the fresh water river running into the sea abreast of the island. It is generally impracticable to land on the beach in its vicinity, and permission must be obtained for this. All supplies must therefore be obtained at the Water Port, and they are brought there by donkeys, at the rate of 2d. for ten gallons. The temperature of the climate ranges between 70° and 50° during the year. Stock is not plentiful, nor in good condition, and prices not very moderate at this season of the year."

At about 8 miles to the S.W. of Mogador is Cape Sim, which is a low sandy point, sloping gradually from a considerable height, and terminating in reefs of rocks which surround the point at the distance of nearly a mile. The intermediate coast to Mogador consists of sand-hills about 70 feet high.

From Mogador to Cape Ghir, the course is S.W. by W., by which you will avoid the rocks bordering Cape Tefelneh. The land about Cape Ghir (distant 6 leagues from the Cape Tefelneh) is very remarkable by a high, round hummock in the interior, visible at a distance of 12 miles. A reef extends from the north side of the cape, some distance, so that it is advisable not to approach it to less than 20 fathoms water. About 9 leagues from Cape Ghir is the reported position of the Cleveland Reef, which is referred to in Table 2, in a subsequent page; it is said to have only 3 or 4 feet water on it.



A Cape Ghir, S. 5° W., distant 3 leagues.

AGADIR, OR SANTA CRUZ, stands about 6 leagues S.E. of Cape Ghir, at the bottom of an extensive bay, where there is an excellent well-sheltered anchorage for vessels of all sizes ; but the commercial character of this place having ceased, it is in consequence but little frequented. The high land, extending from Cape Ghir to Agadir, usually named the heights of Idantenan, is the western extremity of the main chain of the Atlas, which ranges hence in an E.N.E. direction, and rises at 9 miles to the eastward of Agadir, to the height of 4,500 feet, and a remarkable conical hill, nearly 4,000 feet.

At 6 or 7 miles to the N.W. of Agadir, above a point stretching into the bay, is a good anchoring place, with from 20 to 12 fathoms. In sailing from the cape to the road, be sure to run along by the land of the cape till you are before the castle, because northerly winds are very prevalent here ; and should you keep too far from shore you may be forced to fetch it up again with difficulty. If coming in by night, approach no nearer than in 12 or 14 fathoms. To anchor in the road of Agadir, bring the castle to bear N.N.E., and the storehouses E.N.E. Here you will be to the southward of a rocky ledge, lying off the town, in 7 or 8 fathoms of water. The best riding is with Cape Ghir bearing North, in 6 or 7 fathoms. Care must be taken to have your anchors ready ; your small bower is always to be laid out before the land-wind, and the others to seaward ; the sheet-anchor must also be in readiness, and brought out to the S.W. against a storm, which is soon perceived by the rising and swelling of the sea. It is likewise necessary to keep the foresail to the yard, that you may defend yourself the better, should you happen to be driven from your anchors.

At 5 miles to the southward of Agadir is the mouth of the Sous, a fine river, rising at the base of the Atlas ; but the bar is dry at low water, and can never be passed by vessels drawing more than 4 or 5 feet. The Wad Mesa, about 20 miles from the Sous, has likewise a bar, dry at low water, but may have 4 or 5 feet over it at high water, spring tides.

At a few miles to the northward of the Mesa are the Tomieh, or Seven Wells, off which is an open roadstead. From the Mesa, southward, the beach still continues sandy, but verdant hills, approaching the sea, break off into cliffs, apparently of sand-stone, about 100 feet in height. In the interior is a ridge of high mountains, at 50 or 60 miles from the coast. The interval between appears like a wooded and well-cultivated country, with many houses and farm-buildings. Immediately to the southward of the cape is a little sandy bay, and a valley crossed by a hill, on which stands the village of Agulah : a small stream runs down the valley. At 12 miles to the southward of Agulah, the features of the country change ; the hills become barren and abrupt, and form in successive ridges, gradually increasing in height, till they join the line of mountains, which rise to the height of nearly 4,000 feet, and appear to be the S.W. extremity of an off-set of the Atlas. More to the southward, the appearance of the inland country continues the same, but the coast changes to dark red cliffs, broken into coves, on the beaches of which boats may be seen.

In latitude $29^{\circ} 22' N.$ is a remarkable white cliff, which forms a good mark for the coast ; behind it, and standing alone, is a conical shaped mountain, rising to the height of 3,900 feet. At 25 miles from shore are soundings of 105 fathoms, broken shells,—outside of which the bank drops very suddenly. On standing inshore the soundings decrease rapidly to 60 fathoms. At 5 miles from shore are 28 fathoms, coarse sand ; the depth thence decreases very gradually to the beach. From the cliff, above described, the country assumes a more rugged and barren appearance ; the hills steep, with deep and narrow ravines ; the coast, alternate cliffs and sandy bays, with promi-

nences rocky and rugged. In latitude $29^{\circ} 10'$ N. is the Regula, or Gueder Cove, on each side of which a rocky cliff projects to a short distance, having steep and barren sides; these are separated by a deep and narrow ravine, down which a slender stream finds its way to the sea. In this cove the water is deep, and bottom clean to the beach; a landing may generally be effected in it, but it affords no shelter. In latitude $29^{\circ} 3'$ N. the mountainous country terminates, and a sandy desert commences. There is also a break in the coast, named the Rio de Playa Blanca, or White Beach River; at 4 miles to the southward of this the coast is of bold sand-stone cliffs, with sand downs in the interior devoid of herbage, and thus it continues to Cape Noun.

CAPE NOUN is a cliff of sand-stone, 170 feet above the sea; it is steep-to and clear of danger. Here the depth gradually increases outward, and at the distance of 4 miles from shore the depths are from 30 to 34 fathoms, bottom of reddish sand; at 12 miles, 57 fathoms, dark sand; and at 30 miles, 98 fathoms, coarse red sand; the water then deepens very suddenly. For a long distance, both to the northward and southward of the cape, as well as to seaward, the water is very much discoloured; it has a red tinge, and is so thick that the track of a ship is visible for a length of time. At 4 miles to the S.W. of Cape Noun is the River Shleema, and 31 miles more is the Akassa. Each river has a bar, but both appear to have deep water inside, and the banks of both are verdant and fringed with shrubs. The Shleema, when well open, may be recognised by two remarkable hills, which will then appear in the centre of the gap; they are conical, and on one of them, 325 feet high, are some ruins, said to be those of a fortress. The coast between Cape Noun and the Shleema affords secure anchorage, with a moderate depth of water, from the month of March to October.

From the River Akassa the coast and country continues as described above. The cliffs are about 120 feet in height to the Porto Cansado, a fine sandy bay, having 9 or 10 feet within a cable's length of the shore. The distance across is about 3 miles: the two outer points are broad, closing to within one mile, and have a ledge of rocks extending from each point, which leaves a fair entrance of half a mile in breadth, with deep water; against these ledges the sea breaks violently, but in the harbour it is smooth. From the windward side of the harbour a ship might lie very well, with the wind at N.E. Its only distinguishing mark is a table hill, 580 feet high above the sea. Nothing can be conceived more dismal than the appearance of the shore hereabout. For many miles not a dark spot is to be seen to break the monotonous appearance of the sand; the fine particles of which mingling with the haze, occasioned by the heavy surf, render the coast very indistinct.

At a short distance to the westward of Porto Cansado a cliff, from 90 to 100 feet in height, again commences, and continues for 17 miles. This cliff is of dark sand-stone, and the bottom, being also of dark sand, gives a green appearance to the water. A flat desert extends inland as far as the eye can reach. There is no beach, the sea breaking against the cliffs, on which it appears to be encroaching. Where the cliffs terminate the land becomes broken into sand-hills, partly covered with bushes, and the coast trends in a true direction S. 80° W. to Cape Juby, 15 or 16 miles.

CAPE JUBY is a low sandy point, having near its extremity a hummock covered with bushes, appearing like an islet. Rocks extend from the cape to one-third of a mile. Here the coast changes abruptly to S.W. (true, and forms some coves, off the points of which are scattered rocks. From Cape Noun to Cape Juby, the bank of soundings extends to an equal distance, and the depth decreases very gradually to the shore.

CURRENTS.—From Cape Spartel, along the coast, to Arzila, and also to the distance of 7 or 8 miles from the shore, a regular tide was experienced, during the survey, running parallel to the coast; but its strength was rather greater to the northward than to the southward. In this distance, at 15 miles from land, no tide or current was perceptible. From Arzila, southerly, a tide was still experienced, gradually diminishing in strength, till its direction could not be ascertained. From the parallel of $34^{\circ} 30' N.$ to the distance of 20 miles in the offing, a steady southerly set was first experienced. This current, in the offing, continues invariably to follow the direction of the land; its velocity increasing or diminishing from the rate of four-tenths to one mile an hour, according to the strength or continuance of the northeasterly winds.

From Mogador to Cape Bojador the current continues invariably to run in the direction of the coast. Its greatest strength is usually at the distance of from 3 to 6 miles from the land, gradually decreasing on receding from it. Its average rate, between $31\frac{1}{4}^{\circ}$ to $28^{\circ} N.$, is from one-half to three-quarters of a mile in the hour. At Cape Juby, probably from its stream being in some measure confined by the projecting cape, and perhaps by the Canary Islands (distant 58 miles), it increases its rate to one mile and a quarter, but diminishes off Cape Bojador to one mile. It did not appear that this current was influenced by any particular wind, but near shore a tide was generally perceived.

CAPE BOJADOR has some rocks about it, but on its south side there is anchorage in 4 or 5 fathoms, or farther out, about a league distant, in 18 to 20 fathoms. There is no road of any consequence in all the intermediate coast, between this cape and Vera Cruz. It is for the most part desert, inhabited by various tribes of Arabs, who make captives of all who happen to fall into their hands. Along this dangerous coast are numerous rocks, even, or nearly so, with the surface of the water, over which the sea breaks violently; the current also sets with great rapidity towards the shore, so that we regret to state, that vessels are but too often wrecked and endangered, by getting driven too near the land, for the want of due calculation in this respect, which is so highly essential on this deceitful coast.

From Cape Bojador, the coast trends S.W. $\frac{1}{4}$ W. ($S. 20^{\circ} W.$) about 21 leagues, to a very remarkable cliff, about 300 feet high, named the *Penha Grande*. As its height considerably exceeds that of any spot in its vicinity, it may serve as a good land-mark. It is flat and arid; all its declivities are precipices, from broken earth which has fallen down, the colour of which is gray. The whole of this coast is perfectly clean, even to the beach. From the *Penha Grande*, the coast trends S.S.W. $\frac{1}{4}$ W. ($S. 6^{\circ} W.$) 8 leagues, and includes a slender bay, named *Garnet Bay*. It then forms a well-defined elbow, and trends nearly S.W. by W. $\frac{1}{4}$ W. ($S.W.$) 29 leagues. The whole of this beach is continually washed by an exceedingly heavy surf, and there is no sign of vegetation on the whole coast.

GARNET BAY, or *Angra dos Ruivos*, abounds with cod, bream, hake, and various kinds of other fish. There is good anchorage in it, to the northward, with fine sandy bottom. Two leagues to the southward of *Garnet Bay*, are seven small table hills, named the *Seven Capes*, which constitute an excellent land-mark. From hence to the *Rio Ouro*, or *Gold River*, the distance is 18 leagues: here there is good fishing and fresh water, but the river itself is shallow and dangerous. No particular current was observed off the *Rio Ouro*, which consequently does away with the supposition of a river emptying itself by this opening. From the southern point of the *Rio Ouro*, the coast trends nearly S.W. ($S.S.W.$) The cliff continues to a distance of 5 leagues, when

white sandy downs succeed, of which the summits are mostly flat. At 1 league northward (N.N.W.) from the extremity of the cliffs, and at 3 miles from the coast, there is a bank, having only 32 feet of water; its direction is parallel to that of the coast, and it is about 2 miles in length. Thirteen fathoms have been found on the edge of this bank: to the northward of it the bottom is sand and shells; to the southward, fine sand; and on the bank itself, broken shells.

CINTRA BAY is distant about 4 leagues from the Rio Ouro, and is distinguished by a peaked sand-hill, of remarkable appearance. The bay is shallow on the north, by a low projecting point, having a reef extending from its southern extremity, distant from the south side of the bay, which is also encumbered with a reef, about 6 miles; there is also a rock, nearly in mid-channel, over which the sea breaks in tempestuous weather. About a mile within the entrance is a depth of 47 fathoms, sandy bottom; but between the mid-channel rocks and the reefs, on either side, are 9 and 10 fathoms.

From Cintra Bay the coast trends S.S.W. $\frac{1}{2}$ W. (S. 10° W.) to a distance of 7 leagues; the shore at first is low, but it gradually rises, and becomes a continued down of white sand. In the interior are 4 or 5 sand-hills, named the Downs of Cintra, which serve as a mark for the coast, and may be seen 4 or 5 leagues. The Bay of St. Cyprian is formed by Cape Barbas on the west side, and a high cliff, having a flat top resembling a fortification, forms the east point. The bay is open from N.E. to W.N.W., and affords but little security from the prevailing winds.

From Cape Barbas the coast trends nearly W.S.W. (S.W.) 3 leagues. It is formed almost by one uninterrupted cliff, about 80 feet high, at the foot of which the sea breaks violently. At one mile from the beach there are from 9 to 12 fathoms; and at 2 miles, as much as 17 fathoms, with a bottom of muddy sand, or sand and broken shells. The coast then declines into white sandy downs, studded here and there with cliffs. At 3 leagues from this it forms rather a remarkable little bay, with shore of white sand. The mouth of this bay is barred, at about 3 miles from its bottom, by a flat of banks and reefs, on which there is very little water. These reefs form an islet, named Pedra da Gall, and another small islet, named Virginia. The first, which is rather higher on the northern than on the southern side, is about half a mile in circumference; the latter, or southern one, is three times that size, and has some sandy patches. At one mile westward from these islets may be found 18 fathoms of water, with muddy sand. The depth increases to the southward, and the bottom becomes harder. From Pedra da Gall to Cape Blanco the distance is $29\frac{1}{4}$ leagues. The coast in this extent is nearly straight, and moderately high; it is one continued down, the whiteness of which becomes more vivid on approaching to the southward.

CAPE BLANCO is a high white cape, of remarkable appearance. There is a bay formed by it and another point, 4 miles to the northward, having a beach of white sand interspersed with masses of the white cliffs, through one of which the sea has perforated a hole in the shape of an arch. In this bay, as well as anywhere along the coast, as far as Cape Corveiro, there is good anchorage in 10 to 12 fathoms. There is a bay on the east side of the promontory, named Greyhound Bay, in which, as well as within 10 miles round Cape Blanco, the currents are subjected to regular tides, the flood setting E N.E., and the ebb the contrary, its greatest velocity running 1 to 2 miles an hour.

Captain Belcher says, "The tides about Cape Blanco are irregular, and *much influenced by the land near which they run.* High water, at full and *change, may be looked for about noon; the greatest rise, under every ad-*

vantage of springs and winds, does not exceed 6 feet. Southward of the parallel of the cape, the indraught has a velocity of 2.6 miles, and the off-set or ebb the same. Eastward of the meridian of the cape, the tide bends northerly; and at 3 miles chord, its velocity appears from S.W. to N.E., about $2\frac{1}{2}$, following the circular course into Greyhound Bay. North of the parallel of the cape, the ebb sets north, and flood south; and, close in shore, the tide is considerably weaker than at 3 miles, where its greatest influence may be expected."

THE BANK OF ARGUIN.—Twelve miles S. by W. from Cape Blanco, is the formidable bank of Arguin, extending as far south as Cape Mirik, where it is met by another small bank, and between which there is a passage nearly 5 miles wide, with 4 fathoms, leading into the bay and river St. John. This bank is dangerous, and ought carefully to be avoided by vessels making Cape Blanco, bound to the southward. On its north end there is a ledge of rocks, forming the entrance to Greyhound Bay, on the east side. On the western end of the bank are only 3 fathoms, whereas close outside are 20 fathoms; in coasting along, therefore, it will be prudent not to approach nearer than 30 to 35 fathoms, as far as Cape Mirik.

CAPE MIRIK is a low sandy point, on which there is a small down, and should not be approached nearer than 2 or 3 leagues. The coast to the southward of the cape is low, and represents a chain of small regular downs of white sand, interspersed with small bushes, forming an indent of the coast named Tanit Bay. The coast then trends to the S., to some remarkable downs, named the Angel Hillocks, which serve as a good land-mark, being nearly 100 feet high, and will be found of much service in avoiding the Angel Bank,—a shoal, extending about one league from the shore, abreast of the northern hillock; indeed, no part of the coast hereabout ought to be approached to a less distance than 5 miles, nor a less depth than 8 fathoms.

PORTENDIK is distant about 4 leagues to the southward of the Angel Hillocks, on an elevated spot, the beach being distinguished by two palm trees,* which served as a good mark for the place, scarcely a vestige of which now remains. From the two palm trees, the coast trends nearly S.S.W. (South) then to S.W. (S.S.W.) It is straight and low, interrupted with small bushes, and presents a continued sameness. In an extent of 35 leagues, there are only two downs of red sand, covered with brushwood, and these are only discernible at about 2 miles from the beach.

RIVER SENEGAL.†—The River Senegal enters the Atlantic by two embouchures, between $15^{\circ} 50'$ and $16^{\circ} 30'$ N. latitude. It is the largest river in Senegambia, and drains nearly half the surface of that country. The eastern and most mountainous parts of Senagambia, those which lie between latitudes 10° and 15° N., and between longitudes 7° and 12° W., are traversed by numerous rivers, which, by their union, form the Senegal. The largest of these branches are the Ba Woolima and the Ba Fing. The last-mentioned river is justly considered the principal branch, as it traverses a much greater extent of country than the other rivers before it joins them. It rises, according to the statement of Mollien, in latitude $10^{\circ} 30'$ N., and longitude $10^{\circ} 45'$ W., in the mountain range, which encloses the elevated table-land of Fouta Jallon on the south, and divides the waters which fall into the Ba Fing from those

* One of these palm trees has been blown down, and the other broken, so that now but a small stump remains, which is situated in lat. $18^{\circ} 19'$ N. (1837.)

† It is recommended at all times to take a pilot for the rivers and harbours on this coast of Africa, as since these directions were written it is probable that a great alteration has taken place, not only in the shape and direction of the shoals, but also in the flat alluvial land forming the shore. Heavy gales are known to produce serious effects on the coast, so that places where at present there are small flat islands, may, in the course of a few years, have them entirely swept away.

which join the Kabba, one of the largest rivers of Siera Leone. The course of the Ba Fing, to its junction with the Woolima, exceeds 400 miles. The other great branch of the Senegal, the Ba Woolima, rises above 350 miles from the source of the Ba Fing, to the N.E. at the eastern extremity of the mountain range, which separates Senegambia from Soodan, and at no great distance from the banks of the Joliba, or Quorra, near 13° N. latitude, and $6^{\circ} 40'$ W. longitude. Its course is first to the N.W., and then nearly West, at a short distance from the mountains, until it joins the Ba Fing, after having run more than 300 miles. From the south it is joined by the Kokorro, which exceeds 200 miles in length. The union of the Ba Fing with the Ba Woolima takes place near latitude $14^{\circ} 10'$ N., and longitude $10^{\circ} 30'$ W., and from this place the river is named Senegal. About 15 miles below the union of its branches, the Senegal contains a cataract, named the Feloo Falls, which according to the statement of Golberry, is 80 feet high. In this part the river runs N.W., but it soon turns to the West; and, at the distance of about 100 miles below Feloo Falls, it is joined from the south by the Ba Faleme, which flows more than 100 miles, and is navigable for a considerable distance from its mouth, during the rainy season.

Between the river and the Atlantic there is a strip of low land, nearly level and covered with sand; it is named the Point of Barbary. and gradually diminishes in width, so that opposite the Island and Town of St. Louis it is less than 300 yards across. About 5 miles farther south, it terminates at the mouth of the river. The tract of land enclosed by the Senegal and Sagueria, consists of many islands, two of which are of considerable extent, and separated from one another by an arm which branches off from the Saguerai, and joins the Senegal. The northern island is named Bequio, and the southern, Bifeche. These islands are entirely covered with wood, and in the wet season a great portion of them is laid under water. The course of the Senegal, as far as it runs southward, is nearly 40 miles long; but its waters in few places run in one channel, the middle of the river being occupied by a string of islands, some of which are several miles in length, and in some places more than half a mile in width. Even after its junction with the Saguerai, the eastern banks continue to be skirted by islands. The greatest depth of the river is generally found to be west of the islands. Its currents are very rapid, and contain a large quantity of sand, which, when brought to the sea, meets the swell of the ocean, and is thrown back towards the land. Thus a bar has been formed across the mouth of the river, on which there is very little water, except at one place, where the currents have forced a passage through the sands: this is named the Pass of the Bar; it is generally about 250 yards wide, and 15 feet deep, but these dimensions are subject to change. Only vessels drawing 11 or 12 feet water can pass through this entrance of the river, as the surplus is necessary for the pitching of the vessels, which is produced by the strong swell of the sea. The mouth of the river was formerly two miles farther south than it is at present. In 1812, an unusually extensive inundation opened the present mouth, through the narrow sands of the Point of Barbary, and the old mouth was almost entirely filled up with sand.

As a navigable river the Senegal is far inferior to the Gambia; for the Gambia has no such obstacles at its mouth, and the Senegal is much inferior to it in depth, and so full of shoals, that it cannot be navigated by large river barges in the dry season. Gray states that at the end of the dry season it is only 18 inches deep near Bakel, or Baquelle, the farthest of the French settlements. *The ascent of the Senegal is only practicable in the wet season, and even then the voyage is slow and tedious, partly on account of the*

rapidity of the current, and partly because of the numerous windings. It may indeed be ascended to a greater distance than the Gambia, to the foot of the Feloo Falls, which are more than 500 miles from its mouth; but in general it is only navigated to the mouth of the Faleme. The river begins to rise some weeks after the rains have set in, generally in the first week of June; sometimes it attains the height of 40 feet above its lowest level at Bakel, but lower down it does not rise so high. It attains its highest level in the month of August, and begins to fall about the middle of September. In November, or the beginning of December, it again enters its bed. The inundations produced by the rise, appear to be most extensive along the lower part of its course, especially when the islands of Billos and Morfil occur.

CAPE VERDE.—Between the mouth of the Senegal and that of Gambia, and nearly at equal distances from each, lies Cape Verde, a wide projecting promontory. Its western extremity is a mass of rocks, of moderate elevation and volcanic origin. In its character it greatly resembles the Cape Verde islands, which are nearly 500 miles from it, in the Atlantic Ocean. The northern descent of this isolated mass is rather steep, and at its eastern extremity are two hills, rising about 600 feet above the sea, which are named *manelles*, or *paps*, and serve as a beacon to mariners. The *paps* are discernible, in fine weather, at a distance of 25 miles: it is almost unnecessary to warn the mariner not to mistake for them two small hills of a similar form, which lie 12 leagues to the eastward, as the direction of the land is considered sufficient to discriminate. Between the River Senegal and Cape Verde, is the Bay of Yof, which is too deep to afford anchorage, even close to the shore; vessels bound to the southward, should therefore keep well to the westward to avoid the Almadics Rocks, extending a mile off the cape. The sea on the Almadics breaks incessantly. Amongst the rocks are some smooth spots, appearing like channels, fit for boats. The flat may be coasted at the distance of a mile, there being, on the west, 35 fathoms of water; the bottom is of broken shells. Hence, to the northward, in an extent of 3 miles, the depth increases to 80 fathoms; bottom of mud and sand. To the S.E. the depth is not so much; in running along these breakers and the coast, to a distance of 2 miles in that direction, which will extend to the meridian of the *paps*, the depth varies from 25 to 30 fathoms; the bottom sand and shells, or sand and rock. The depth continues to decrease to the E.S.E.

About 3 leagues S.S.E. $\frac{1}{4}$ E. from Almadic Ledge, is Cape Manuel, between which are three small islands, named the Magdalens, the largest being perforated at its south end sufficiently wide for a boat to pass through. Cape Manuel is high, covered with brush wood, and terminates at the sea side in basaltic cliffs; it forms the western point of the Bay of Goree, Cape Naze forming the other extremity.

At the distance of 2100 fathoms from Cape Manuel, E. $\frac{1}{4}$ N., lies the island Goree, and a vessel intending to anchor must steer for it, and may approach on the south side, within two musket shots. The island is merely a rock, about 400 fathoms in its greatest length, from N. $\frac{1}{4}$ E. to S. $\frac{1}{4}$ W., (N. by W. to S. by E.) and 167 fathoms in breadth. The southern part, which is about 500 feet above the level of the sea, is the highest, and like a round mountain, may be seen at the distance of 5 or 6 leagues. The rest of the island is very low, and the north point is distinguished only by its batteries and private buildings. The landing-place is on the N.E. side of the island, between the point and the back of the mountain, to the southward, in a small sandy bay. It is said that a small light is shown here.

The roadstead of Goree is to the N.E. of the island. This roadstead, which is sheltered from all winds from S.S.W. to E.N.E., (by the north) is perfectly safe, during eight months of the year; that is, from the first of November to the first of July; but during the rainy season, the squalls from the S.E. are dangerous. The best anchorage for large vessels, in either season, is at the distance of 800 fathoms from the landing-place, with Cape Manuel bearing W.S.W. $\frac{1}{4}$ W. (S. 52° W.) a sail's breadth open of the north point of the island. At this spot there is a bottom of thick clayish mud, with a depth of $12\frac{1}{2}$ fathoms, which it is convenient to weigh from, with the wind from any quarter. To fetch the anchorage from Cape Verde, in the fine season, when the winds are from N.E. to N.W., it is necessary to run close by Cape Manuel and the south point of Goree, keeping by the wind on the port tack, and sounding until in 8 or 10 fathoms. When within a mile of the land, tack and beat up to the anchorage.

Along the whole coast, from Cape Manuel to Cape Naze, a vessel may run at a distance of 2 miles. There is only one bank in this space, the least water on which is $2\frac{1}{2}$ fathoms. In the neighbourhood of Cape Naze are several negro villages, the most considerable of which is named Rufisk, here there is a roadstead, where, in fine weather, you may lie in 6 or 7 fathoms; some rocks, however, lie off this place, but these may be avoided by keeping half a mile from the shore. There are some rocks, westward of Rufisk, stretching about a gun-shot into the sea, which may be avoided by keeping half a mile from the shore. To the West and W.N.W. of Cape Naze is good anchorage, in 4 and 5 fathoms, fine sand; but to the South and S.W. of the cape, the bottom generally is not good. In the night-time, you must proceed in 17 fathoms, having sometimes recourse to the lead; the land, even in the night, will direct you sufficiently to avoid the rocks. In the season of the tornadoes, the road of Rufisk is not good; but in the summer, you may safely lie there in 6 or 7 fathoms, close to the shore, if agreeable.

About $3\frac{1}{2}$ miles S.E. of Cape Red, which lies to the southward of Rufisk, is Cape Naze; and $4\frac{1}{2}$ leagues from the latter, is the French factory of Portudal, having a roadstead only fit for small vessels, and that but indifferent. At $6\frac{1}{2}$ leagues from Portudal is Point Joal, between which, lying in a parallel direction with the coast, distant about 2 leagues, is the Amboroo Bank, having but $1\frac{1}{2}$ fathom on its southern extremity. This danger must be carefully avoided, and should not be approached nearer than 6 fathoms. Its greatest depth is 3 fathoms, with very hard sand. Between it and the land is a channel of 5 or 6 fathoms, and close to its western side is 5 fathoms.

The River Joal is about 3 leagues S. by E. $\frac{1}{4}$ E. (E.S.E. $\frac{1}{4}$ E.) from Cape Serene. Here stands a town, of the same name, on the north bank of the river, from which a shoal, having but $2\frac{1}{2}$ fathoms' water, projects into the sea. The road of Joal is indifferent, and only fit for small vessels; the entrance of the river has a depth of 3 fathoms in mid-channel. From Palmarin Point, the south point of entrance of the River Joal, the coast trends South, (S. by E. $\frac{1}{4}$ E.) 8 leagues, to the Birds' Island—some islands lying on the Red Bank, a sand that commences at the river Salum, about 4 leagues from Palmarin Point, and stretches along the coast, projecting $4\frac{1}{2}$ miles into the sea, and having 4 fathoms' water close to its outer extremity.

RIVER GAMBIA.—The Bird Islands, with Cape St. Mary, form the entrance to the River Gambia, lying from each other N. by E. and S. by W. 4 leagues. Vessels bound to the River Gambia, on leaving Cape Verde, may run in safely during the night, by not coming nearer than 9 or 10 fathoms; by *which precaution, they will avoid the Amboroo Bank, the shoals of Joal, the Red Bank, &c.* In 1819, a flagstaff, with a union jack, was erected on the

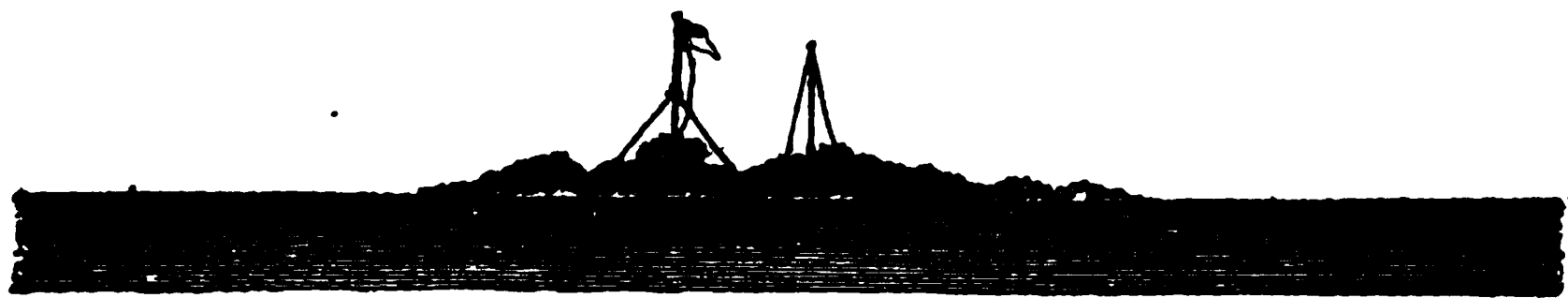
easternmost Bird Island, to denote the pilot's residence for the river. From hence to the town of *Bathurst*, on the western shore of the river, the distance is 4 leagues. Cape St. Mary is low, appearing like a plain, but rising towards the interior, having a few trees and one house upon it. Between Banyan, or Bathurst Point, and Barra Point, to the N.E., the river is only $2\frac{1}{2}$ miles wide, it being the narrowest part of the mouth of the Gambia. From Banyan Point projects a dangerous rocky shelf, named St. Mary's Shoal, which extends 5 miles N by W. $\frac{1}{4}$ W., (N.N.W. $\frac{1}{4}$ W.) being even with the water on the ebb. A mile to the N.E. of this is the Middle Ground; and three-quarters of a mile to the northward of the latter is the African's Knoll. These dangers are separated by deep water of 4 to 6 fathoms, but they must all be left on the starboard side, by keeping towards the eastern shore.

The following instructions for entering the Gambia are by Captain Belcher, R.N. When the pilots are absent from their station they will be found of service:—

“The best latitude on which to approach the entrance of Gambia is $13^{\circ} 33'$ N. The first soundings, when in a situation to look out for Bird Island, will be according to the time of tide, in 5 or 6 fathoms, softish sand. Should mud be found, it will be proper to edge southerly until a cast of sand, or sand and mud mixed, be obtained which will be on the extreme limits of the bank, and about 10 miles from a shoal named the Middle Ground, but towards the southern side of the channel. From this position the Convalescent House on Cape St. Mary will be visible, and Bird Island will then bear about E.N.E.; but E. by N. should be made good until the flag staves on that island can be clearly discerned.

About the same time that Bird Island is perceived, a remarkable round-topped tree will be seen on the mainland to the eastward, between E. by S. and E. by N.; it is one of the principal marks of the pilots, and is noticed in the chart about 3 miles inland of Booniadoo Point. Before bearing away for the channel, this tree should be brought to bear E.S.E. $\frac{1}{4}$ E., and Bird Island staves N.E., with which bearings they will have the following appearance, the centre of the rigged staff being in one with a wild plum bush. The depth there will be $4\frac{1}{2}$ or 5 fathoms, at low water.

Rigged Staff. Black Staff.



Bird Island. Plum Bush in one with Rigged Flag Staff, N.E.

From thence steer directly for the tree, or keep it just over the port cat-head, until the two staves on Bird Island are in one, about N. by W.

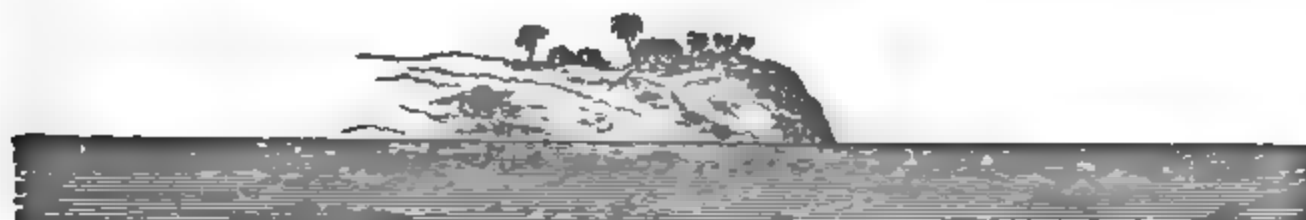
The mouth of Jinnak Creek, will now be clearly seen to the left of the tree; and the two projecting points of sand, A and C,* on its northern shore, in one with the intermediate projection from the southern shore B, as shown in the chart, and bearing about E. $\frac{1}{4}$ N., will clear the African Knoll to the northward. Pilots seldom attempt the channel to the southward of the African Knoll in vessels drawing more than 10 feet. Before bearing up for

* See Chart of the River.

the channel, the line of the two staves on Bird Island must be crossed to the eastward, and the Black Staff brought clearly to the left, or westward of the Rigged Staff.

Another confirmatory remark in clear weather (when within the Knoll) will be Cape St. Mary appearing as below, and bearing nearly S. W. by W. $\frac{1}{4}$ W. If carefully watched, the point on this cape on which the Convalescent House is situated will suddenly change its appearance, from the circumstance of its shutting out a low sandy beach (which before rendered the point undefined) so as to become a distinct point with the trees to the horizon.

Convalescent House.



Cape St. Mary, bearing S.W. by W. $\frac{1}{4}$ W.

Being now nearly within the African Knoll, the vessel may be steered for Barra Point till past the Middle Ground. But it must be observed that both the ebb and flood of the main stream, as well as of the creeks, bear distinctly towards the Middle Ground and African Knoll, and therefore the Black Staff on Bird Island must be still carefully kept open to the westward of the other, as before directed. The tendency of those staves to close, or not, will always show the actual set of the tide. The Middle Ground having been thus passed, and the lead kept going, steer so as to keep Barra Point flag-staff open on the port bow, and not to shoal the water under 6 fathoms, till Bathurst flag-staff is clearly visible. When it bears about S. by W. $\frac{1}{4}$ W. it may be safely brought over the starboard cathead.

Should the flood be running, bear in mind that abreast of Bathurst it sweeps up rapidly, therefore clew up and prepare for anchoring east of the staff. The best berth is in 12 fathoms, with the back and outline of the fort showing as the outer objects, and just clear of the merchant vessels.

Nearer to the fort the holding-ground is bad, but there need be no fear of tailing on the beach, as it is steep-to, and a vessel may ride at the extremity of her scope, within 50 yards of the fort without touching.

The preceding directions are given to enable the mariner to enter this river without the assistance of pilots, who sometimes delay coming off; but as they have been lately placed under better regulations, more regularity may be expected.

The black additional staff on Bird Island was erected in the year 1831 as a mark for the African Knoll, and bears from the other S. by E. $\frac{1}{4}$ E. (or S. 31° E., true) 210 yards. If this bearing-line be continued it will cut the northern extremity of the African Knoll, and pass very close to the eastern elbow of the Middle Ground, but it will then clear all dangers up to Barra Point. The old staff is white, and has a topmast. The new, black, without topmast. When clearly seen, and within 4 or 5 miles, if the black one be kept well open to the right of the other, as in the view, the vessel will be clear of danger; and so long as the lead gives mud, the channel is always safe.

Water is procured at Bathurst, but only by the consent of the merchants, *all the wells being private*; but none obtained here can be pronounced good, *except for culinary purposes*. Better water may be had at Jillifree. Wood

also is obtained at Jillifree ; or may be purchased at Bathurst with less risk, and better calculated for a lasting supply—probably in the end cheaper than employing the crew. Provisions are as plentiful as on other parts of the coast, and there is a tolerable market every day at 10 A.M., at Bathurst, about 200 yards to the westward of the staff."

To mark the channel into the Gambia still more distinctly, Government has recently sent out two large buoys—one (black with a staff and ball) to be moored with chains at the western side of the African Knoll, and the other (white) on the eastern elbow of the Middle Ground.

In 1826, Captain Owen, R.N., made an extensive survey of the River Gambia, from whence it appears that 3 miles above Fort James it is $2\frac{1}{2}$ miles in breadth, it then takes a north-easterly direction, 10 miles to Moota Point, on the south shore, leaving a creek, named Jukarda, on the north side, and has a depth, in mid-channel, of $4\frac{1}{2}$, 5, 6, and 7 fathoms. A line of coast one mile in breadth, and 40 miles in length, terminating at Jukarda Creek, was ceded to the British government, by the native chiefs, in 1826, the small settlements of Albreda alone excepted. From Jukarda Creek the river pursues an easterly course, alternately shoaling and increasing in depth to a considerable distance. Captain Owen's survey comprehends a distance of 190 miles from the entrance of the river, and exhibits the depths of water as far as Pisanca, where, in the dry season, the tide rises 3 feet : at Pisanca are the ruins of a factory.

About 14 miles S.W. by W., from the pitch of Cape St. Mary, are the Tongui Rocks and Shoal which run out about 5 miles from Bald Cape ; from thence to Cape Roxo it is 20 leagues, along which you may run in safety in the dark, keeping in 6 or 7 fathoms to avoid the bank that extends one league from the shore. There are four rivers before you reach Cape Roxo, the southernmost of which, Casamanza, is the only one accessible, having 2 or 3 fathoms at the entrance, with rocks on each side ; the land about the cape is low, with a sandy beach, near which are several tufts of a remarkably red colour. From Cape Roxo the coast trends E.S.E. to the River Cacheo, the navigation of which is much impeded by the numerous shoals, named the Cacheo banks and Falulo breakers ; and here commence the various shoals, channels, and islands of the Bissagos Archipelago.

BISSAGOS ARCHIPELAGO.—The JEBA CHANNEL is formed on the north side by the main, which is intersected by the several rivers of Cacheo, Jatt, Bassi, and Bissao, thus dividing it into islands, of all of which the land is low. Near the S.W. end of Jatt, S.S.E. of Cape Roxo, is a small conspicuous island, named Cayo, being bold-to, and appearing, on an easterly bearing, like three islands, perceived to be connected by a flat on a nearer approach ; it is well wooded, and may, in clear weather, be seen 4 or 5 leagues, consequently serving as a useful land-mark. At 6 leagues more to the eastward (E.S.E.) off the S.E. end of Jatt are several islets, named the Ancoras, which distinguish the western side of a river of the same name. The extremity or N.W. part of the Bissagos Shoals is composed of hard sand. From this extremity the bank and isles extend to the southward and south-eastward 23 leagues, towards the eastern channel of the Rio Grande ; and the flat, which is from 12 to 6 leagues in breadth, is interspersed with banks above and under water, and islands, either dry or marshy, the detail of which is very little known.

Vessels bound for the Jeba, or Bissao channel, and having made Cape Roxo towards the evening, should come to anchor, bringing the cape to bear North. The outer part of the Falulo Breakers bears from hence S. by E. (S.S.E. $\frac{1}{2}$ E.) distant $17\frac{1}{2}$ miles, lying to the south-westward of Cacheo River.

and extend in an E.S.E. and W.N.W. direction, having 6 to 4 fathoms close to them. Your course, 2 leagues to the westward of Cape Roxo is S.W. by W. $\frac{1}{4}$ W. (S.W.) for 12 miles, then haul up on the port tack, as at this distance the depth increases; afterwards steer S. $\frac{1}{4}$ W. (S. by E.) until you reach the latitude of about $11^{\circ} 45'$ or $11^{\circ} 47'$, in a depth of $6\frac{1}{2}$ fathoms, muddy ground. Here you enter the Jeba Channel, and having run E.S.E. $\frac{1}{4}$ E. (East) 12 leagues, you reach the south end of Cayo, the trees on which, as we have stated, may be seen a considerable distance.

The space to the northward of this track is replete with banks, which extend to the main shore, but those of Falulo are the only ones which break constantly. The depth of water, in the latter course, will be found regular from 7 to 9 fathoms, muddy bottom; it may be further observed that in entering the great channel, it will be more advisable to keep towards the northern banks than those on the south side, as the latter are close-to, whereas, by a constant use of the lead, you will have due notice of approaching the former.

The Great Channel, on the Meridian of the Islet Cayo, is about 4 leagues in breadth, which is again divided into three channels, by means of two banks of shallow water; the northernmost of these is named the Bank of Cayo, having a depth of only 10 feet on it, and lying 4 miles to the southward of the islet of that name; it is rather narrow from north to south, but its length from east to west is about 5 miles. The best of the three channels is to the northward of this bank, in which are from 7 to 9 fathoms. Two miles to the southward of the Cayo Bank lies the Bank of Carasche, being divided by a depth of 9 fathoms: it lies in a parallel direction with the former, and extends about the same distance, namely, 5 miles in an east and west direction. Carasche Bank breaks continually, part of which is dry at low water; it is distant about 4 miles to the northward of an island of the same name, but the channel between is of an irregular depth, and the bottom bad. Carasche Island forms the south side of the Great Channel.

Having arrived to the eastward of the banks above mentioned, and intending to proceed for the settlement of Bissao, steer S.E. $\frac{1}{4}$ S. (S. 60° E.) 5 leagues along the island of Jatt to its S.E. point, having some trees upon it, and appearing somewhat higher than the land thereabout; from hence steer E.S.E. (E. 5° S.) 6 leagues, passing successively the Ancoras Islets, the channel between Jatt and Bassi, and the south part of the last island, on one side; while, on the other, you will cross a large bay, formed by the Islands Carasche and Cerballe: leave the Parroquet Islands on your starboard hand, and finally reach within a league of the west side of Bissao Island. From the S.W. end of the latter to Bonn (hereafter described) the course is E. $\frac{1}{4}$ N. (E. 20° N.) running parallel with the Island of Bissao, and passing several shoal patches of 4 and $4\frac{1}{2}$ fathoms.

Bonn, or Bourbon, is an islet to the southward of the town of Bissao; two miles above it is another, named King's Isles, and 7 miles from it, on the south side of the river, is Arcas, an island on the eastern side of the channel to Rio Grande, and is the distinguishing mark for it.

In proceeding towards Bonn, St. Martin's point of Bissao, $3\frac{1}{2}$ miles W. $\frac{1}{4}$ S. (W.S.W.) from the former, must be avoided, by giving it a berth of a mile and a half; being within 3 miles of Bonn, bring it to bear N.N.E. $\frac{1}{4}$ E. and steer directly towards it, passing about 200 fathoms to the eastward: from hence proceed between King's Island and the fort, keeping nearer the latter, and anchor in 6 to 8 fathoms, soft muddy bottom. *The Road of Bissao* lies in the principal stream of the river Jeba, between the eastern side of the island and King's Island opposite, and is perfectly safe and well sheltered.

The fort stands 100 fathoms from the beach, about 300 paces to the southward of which is the watering-place; the water, though reckoned wholesome, is not agreeable to the taste, and, previous to its being drank, should be acidulated, or purified by red-hot shot.

The Winds in the Great Channel of the Bissagos nearly follow the direction of the land, and vary their course according to that of the channel. In the Great Channel they vary from West to North; while at the anchorage of Bissao they commonly blow from the S.W., except in the morning, when they are from the northward. In the rainy season, which commences in June and continues about 5 months, they blow from the S.E., with the tornados, the same as on the coast, and, then, passing round by the south, return to the northward.

ANCHORAGE.—A vessel may anchor anywhere in the Great Channel, the bottom being of soft mud and excellent holding-ground, with the exception of one place at $2\frac{1}{2}$ miles to the southward of the isle Jatt; here the depth is from 20 to 22 fathoms, and the bottom of coarse gravel. In all other parts of the channel the depth varies from 13 to 6 fathoms, without any sudden alteration.

TIDES.—The usual prevailing currents on the coast, to the northward of Cape Roxo, are found to be completely changed on passing this cape. They have here no longer one only direction; and, in all the channels of the Bissagos, are superseded by tides, which are more or less regular. Those in the Jeba, or Great Channel are perfectly so. Westward of the Isle Cayo the flood sets S.E., and the ebb N.W., each six hours, or nearly so, with the exception that the current gradually assumes these directions, requiring nearly an hour from the change, before it is completely settled in its course. The flood generally sets to the northward, and the ebb to the southward. The greatest difference which has yet been observed between the high and low water marks is 8 feet; and, at the equinoctial full moon, the rate of the flood and ebb is about one mile and two-fifths an hour; at other times it never exceeds one mile. At the entrance of the Great Channel, which is 6 leagues to the westward, and on the parallel of the Island of Cayo it is high water, at full and change, at 9h. 15m.

From the meridian of Cayo, and as far as that of the Isle of Bonn, the stream follows the direction of the channel; and here the tides are regular. It is not known that the length of the ebb exceeds that of the flood. The greatest rate of either never exceeds $2\frac{1}{2}$ miles per hour, in spring tides; and the rise is found to be 8 feet, as outside the channel. On the meridian of Cayo it is high water, at full and change, at 11h. Before Bissao the rate of the highest tides never exceeds 2.6 miles per hour; and the mean rise is $7\frac{1}{2}$ feet. It is high water, at full and change, at the anchorage of Bissao, at 12h. 30m.

RIO GRANDE.—Besides the Senegal and Gambia, which are the largest rivers of Senegambia, the country south of the Gambia is drained by two rivers, which are navigated to a considerable distance from their mouth; these are the Rio Grande and the Nunez, or Kakoondee.*

The Rio Grande is stated to originate on the western declivity of a range of mountains, the waters from the eastern slope of which form the most remote branch of the Gambia, near 10° N. lat., and 11° W. long. As far as its course lies, within the mountain region, it is joined by numerous tributaries, among which, however, the Coomba only is a considerable stream, and its course is rapid. Before it leaves the mountain region it is said to form a cataract, near $13^{\circ} 20'$ W. long., and from this point downwards the river is

* See the Note + at page 125.

navigable for river-boats. At a distance, exceeding 100 miles from the sea, the river divides into several branches. That branch which continues to flow in a western direction is commonly named, on our maps, Rio Grande, but the native name is Butolah. Small vessels may ascend it as far as Bolola, a short distance below the bifurcation. Its mouth is opposite to Bulama Island, which belongs to the group of the Bissagos, or Bijooga Islands. That arm which runs northward, from the point where the bifurcation takes place, is named Jeba river. Having continued in that direction about 50 miles it turns westward, and divides again at the Portugese settlement of the same name. This branch is navigable, for small vessels, from Jeba to the sea, and for large vessels from a point about 5 miles above Bissao. The most northern arm, which is named the Cacheo river, is navigable, for vessels drawing not more than 10 feet water, to the settlements of Cacheo; and for smaller ones much farther. As the country between these arms is exceedingly low, and its soil mostly consists of alluvium, which is inundated for some months in the year, there is said to be a great number of minor channels, by which the principal branches of the rivers are united.

The Eastern Channel or that of *Rio Grande*, branches into the Jeba Channel to the westward of Arcas Island. Its west side is formed by a flat extending to the eastward of the Parroquet and Galinha Islands, and the bank which joins these to the Hog Islands and that of Kanyabac. Its eastern bank is formed by the islands of Arcas and Bulama, with the banks that connect them. Being intersected by the mouth of the Rio Grande, it again commences at Bossessame, and forms a chain of reefs as far as the island Yombere: the channel is here divided into two branches by a bank, 4 leagues in extent from north to south, on which are several islets and breakers, with Cavalho and Honey Islands, and Pullam, which lies to the southward of the latter. The western or main channel is bounded, on the west side, by part of Orango island, and a chain of reefs running S.S.W. from it.

Large vessels proceeding for the channel of Rio Grande, from the northward, must observe that a bar shelters the S.W. part of Arcas Isle, terminating at the distance of 4 miles, by a rocky bank, forming part of the bar, over which are only 3 fathoms at low water. In order that this may be avoided, bring the island to bear E. $\frac{1}{4}$ N. (E.N.E.) and steer so as to keep the western point of Bulama island South, (S. 17° E.) until you reach within two miles of it; from hence, if you intend going to the southward, keep towards the middle of the strait, formed by Bulama and Galinha Islands. Vessels bound to the northward, and having brought Arcas E. $\frac{1}{4}$ N., should steer N. by E. $\frac{1}{4}$ E. (North) until she has passed the parallel in which it lies. The west end of Bulama, or Boolam, may be approached within a mile; the course from hence is S. by E. $\frac{1}{4}$ E. (S. 36° E.) $3\frac{1}{4}$ leagues, crossing the mouth of the Rio Grande, which separates Bulama from Bossessame, and keeping at the distance of a mile from the half-tide banks to the S.E. of Galinha. The depths in this track vary from 30 to 10 and 8 fathoms; bottom chiefly of sand and gravel.

Bulama is well wooded and of moderate height. It has some well-sheltered roadsteads, affording safe anchorage; that on the S.W. side of the island has a depth of 20 fathoms, and although the tide rises 12 to 15 feet, the sea is generally smooth, and the landing easy. Here fresh water may be procured abundantly.

Two miles to the westward of Bossessame, steering South 3 leagues, will carry you to Kanyabac Island, in a depth of 8 to 20 fathoms, red sand and shells. To the westward of this track are the Hog Islands, four in number; the northernmost, *Corett*, appearing remarkable, being covered with large

trees. The eastern side of Kanyabac may safely be approached within a mile, in 6 to 10 fathoms. The S.E. point of the island, named Barel, is high and bold, to the westward of which is a small cove named Manel, where the bottom is good, but the depth shallow. A course S.W. $\frac{1}{4}$ S. (S. 30° W.) 18 miles, will take you two miles off the western side of a very extensive bank, which lies to the northward of Cavalho island, in 10 to 20 fathoms. Continuing the same course, a similar distance, you will reach the eastern shore of Orango island; and also breakers, which stretch more than two leagues off to the S.W. of it. Any course from hence, between S.S.E. and S.W. by W. (S.E. $\frac{1}{4}$ S. and S.W. $\frac{1}{4}$ S.) will lead clear of all danger, and out to sea.

Kanyabac is of moderate elevation, and higher towards the south than the north end. Orango is the most considerable of the Bissagos. Its eastern part is not very high; its S.E. point is named Cape Cameleon, and is remarkable from several spots of yellow sand, which form a striking contrast to the brown appearance of the coast. Pullam island derives its name from the large trees with which it is covered. It is not a mile in extent in any direction, and is little above the level of the sea; its shores are rocky, and difficult to land on, from the heavy surf breaking on them. It is bounded from S.W. to E.S.E. by flats, which extend 4 miles, and are constantly dangerous for large vessels to approach near it.

H.M.S. Leven arrived on the 21st of April, 1821, off the Bijooga islands, and anchored between Yomber and Orango; upon the latter many natives and herds of cattle were seen. On the following day the Leven grounded upon the shoal, at half a mile from the east shore of the isle Bawack, between Kanyabac and Orango, where she lay in a perilous situation until the next tide, when she happily got off. The idea we had been led to form of these islands was extremely erroneous; as, instead of being low and marshy, with scarcely a channel for boats between their muddy shores, we found them a cluster of the most beautiful, fertile, and inviting islands, with moderately high and bold shores, separated by deep water, and containing many fine harbours; most of them being inhabited, and each village having its independent ruler. According to the customs of these people, every vessel stranded upon their shores is forfeited to the chiefs or people; in consequence of which, they considered that they had a just claim to the Leven, when she lay grounded near Bawack.

Extract from the Nautical Magazine, page 207, vol 2. "The principal feature in the character of the Bijooga Indians is avarice, which can only be gratified by the possession of whatever they see. By their importunate demands, and the manner in which they received anything given to them, they seem to believe that the visits of strangers are only for the purpose of making them presents. They received a few baubles from us with some expression of pleasure in their features, but thought of no return, and seemed to consider the presents as at matter of course. During the last forty years they do not appear to have advanced one step in civilization. Their treatment of strangers, and the difficulty of access to their islands, will long perpetuate their barbarous condition. An inordinate spirit of revenge and retaliation is the spring of all their actions, and kindles frequent animosities. The slightest provocation occasions dispute; the least unintentional wrong must be redressed. The nobler attributes of our nature are unknown to them, and their minds are alienated from all moral improvement. Pretexts for indulging this passion will never be wanting; the restless and inflammable tempers of the Bijoogas will always lead them to detect or occasion some cause of offence, and the objects of their revenge will be watched and pursued, till the most rigorous atonement shall have been made.

In justice to them, however, it must be observed, that there is too much reason to believe that they have not always been treated fairly by the few white people with whom they have had intercourse; and there is little doubt that their history would discover much that might be adduced in extenuation of their singular manners. It is said that the first white man who visited Kanyabac imposed on the natives; a circumstance which may account for their behaviour to strangers. The result is, that they are insincere and unjust in their communications,—one which often obtains among people of more pretensions to civilization.

The WINDS in the eastern channel are generally light in the fine season, particularly in the morning and evening. They set in gradually in the afternoon, and almost blow constantly from S.S.W. round by West, to N.N.W.; they remain but a short time at any intermediate point, and soon follow the direction of the land, which trends nearly N. by E. and S. by W. During the rainy season, easterly winds are prevalent, to which period winds from this quarter are entirely limited.

The TIDES are as regular in the eastern as in the Jeba or Great Channel. The length of the ebb is equal to that of the flood; the former sets to the northward, the latter to the southward; but the different points of the channel, and the irregularities of the bottom, affect those directions. The mean rise of the tide is from 12 to 15 feet. The strength of the stream varies according to the breadth and depth of the channel, being greater where it is confined than in the wider parts; it is, consequently, more considerable in the strait of Bulama, and the Honey Island channel, than in any other part. Nevertheless, it seldom exceeds $2\frac{1}{4}$ miles per hour, but is frequently as much as two, at two miles to the westward of Pullam Island. It is high water, at full and change, at 10h. 15m.

The coast, to the south-eastward of the Rio Grande, is shoal and dangerous to some extent from the land. Eight leagues S.E. $\frac{1}{4}$ S. (S.E. $\frac{1}{4}$ E.) from Pullam Island, is the rocky bank of Alcatras, on which is a small islet 50 feet high, surrounded by breakers, with reefs two miles in extent, both from the N.W. and S.E. Between Alcatras and the River Nunez there is another dangerous reef, named by Captain Owen, in 1826, the Conflict Reef, the western side of which is 14 miles, to the S.E. from the Alcatras, and its breadth each way is between 3 and 4 miles. Two other rocky banks lie within a distance of 8 miles to the southward, having a depth of 12 to 16 fathoms, near the most southern extremity, distant about 30 leagues W.S.W. from the entrance of the River Nunez.

THE RIVER NUNEZ, or, as it is named by the natives, Kakoondie, is much inferior in size to those previously mentioned. Its whole course probably does not exceed 250 miles, while the Rio Grande runs more than 400; but it offers a safe navigation to a great distance from the sea. It rises in the chain of hills which separates Senegambia from Sierra Leone, near 13° W. longitude, and its general direction, for about two-thirds of its course, is to the west, and the remainder to the west of south. In the upper part of its course it is full of rapids and falls. It becomes navigable, for vessels of moderate size, above the settlement of Debucko or Rebucko, and up to this place the tide ascends. From this place downward, the general depth of the river may be stated at $2\frac{1}{4}$ to 3 fathoms at low water, with a rise and fall of about 12 feet. The river has three channels at its mouth, two of which are navigated by vessels. The northern admits only vessels drawing less than 12 feet, but the southern may be entered by large ships. They are separated from one another by an island named Sandy Island. The low country, near its mouth, is uninhabited for want of fresh water, and the first settlement,

Walkeria, occurs at the distance of 70 miles from the sea, measured along the course of the river.

Vessels bound to the Nunez should make the land in $10^{\circ} 31' N.$, or, if coming from the southward, should, at least, not advance into less than 7 fathoms, till in that latitude. They will then approach the river, steering $E. \frac{1}{4} S.$ ($N. 75^{\circ} E.$) through regular soundings; and it is necessary to remember, chiefly, that with a flood tide, there is a dangerous rocky flat on the starboard beam, going in; while, on the other hand, a vessel may play with the edge of the breakers on the point of Sandy Island on the larboard side. The constant warning, also, "Keep in mud," which is familiar in all channels along this coast, should be here especially kept in mind.

The following are the directions given for it by Lieutenant Bold, but they must be used with caution:—"When Cove point (the N.W. side of the entrance) bears about N.W., and the south point on its opposite bank East, you will be in 7 or 8 fathoms, in a fair way for the river. Due south of the last-mentioned point there are breakers, and a shoal 6 miles in breadth, some parts dry at low water. Sailing in, keep over within a mile and a half of the south point, for the river is interspersed with banks, to nearly 5 miles from the opposite side. From hence to North Point, the entrance to Talagos River, it is 2 leagues, with a channel of 4, 5, and 6 fathoms; but between which there is a shoal to be avoided, by not bringing the North point to bear farther north than E.N.E. The channel there is only one mile and a half broad, but good anchorage round the point in 5 fathoms, abreast of the river. At the mouth of the Nunez it is high water, on the full and change, at 11, with a rise of 9 feet. The river is navigable 10 leagues up, for vessels of burthen, the least water being 3 fathoms over the flats opposite the river Talagos. The River Nunez has been known as a place of trade in ivory, where, as at the Rivers Pongo, Dembra, &c., it is very abundant."

A small isle, called Young Gonzales, lies about 5 miles to the eastward from the regular entrance of the Rio Nunez. It is the southernmost of three, having channels communicating with the Nunez; and about 5 miles true east from it is the mouth of the River Cappatches. From Young Gonzales a long dangerous flat of rocky ledges, gravel and sand, extends S.W. (by compass) nearly six miles. At low water, a patch, three-quarters of a mile in length, has over it only six feet of water. The Cappatches is a trading river, but shallow, and frequented only by boats, or vessels not drawing more than 4 feet of water.

CAPE VERGA.—About $9\frac{1}{4}$ leagues to the south-eastward of the Nunez is Cape Verga, which is a low point. The high mountains, 3 leagues inland to the northward of the cape, will serve to recognise this part of the coast, as they may be seen 15 leagues distant. Thus bearing East, ($E.N.E. \frac{1}{4} E.$) are they equally useful to ships bound to the Rio Nunez, which, with this bearing, will clear the banks lying without the river, at 5 or more leagues to the south-westward.

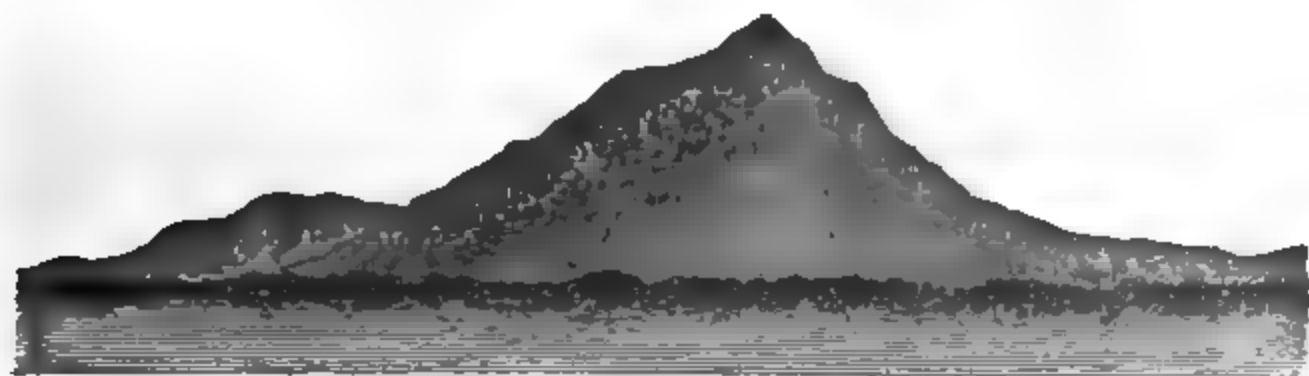
RIO PONGO.—About 7 leagues S.S.E. $\frac{1}{4} E.$ (S.E.) from Cape Verga is the entrance to Rio Pongo, which forms itself into several channels, each impeded by a bar of mud or sand. The best of these is over the Rissing, or Mud Bar, which extends more than 2 miles to the westward of the main channel of the river. On its north side are 6 feet, about the middle 12 feet, and on the south side 8 or 9 feet, at low water. Two hills up the country, bearing E.N.E., serve as a mark for the bar, distinguished also by a grove of palm trees on the north side.

To sail over the Mud Bar, get the river open, and steer in N.E. by E., keeping the two hills, which are moderately high, a cable's length open of

the North Point, by which you will carry 4 fathoms in depth at high water, or 2 fathoms at low water. Anchor in 7 or 8 fathoms, in the middle of the river, abreast the palm trees on the larboard hand, which trees appear to extend about two miles in length; then send your boat up the river for a pilot, or fire a gun twice or thrice, at intervals of about an hour, and in all probability a pilot will come off to you. If bound to this place in the night, approach no nearer than to the depth of 4 fathoms, until daylight. If beating in, stand no farther to the northward than to bring the two hills in the middle between the two points of the river; then stand to the southward to 2 and $2\frac{1}{2}$ fathoms. If going in, with a fair wind, bring the north point of the river, with its palm trees, to bear N.E., and run in with it bearing N.E. by E. On entering, keep on the south side within the bar, as the flood-tide sets on the northern breakers. Should you here have $1\frac{1}{2}$ fathoms, you need not fear, as the bottom is all of mud. The river hence lies east and west, about 8 miles; and its depths, in mid-channel, are 3, 4, 7, 6, and 5 fathoms.

The Sand Bar is 5 miles to the southward of the Mud Bar, and its entrance is more intricate, therefore not to be attempted without a pilot. This is, nevertheless, the mouth of the Rio Pongo, properly so called. In the best channel, at the entrance, the depth is 12 feet at low water, and within it are 4 and 5 fathoms. A small sand bank having showed just above water, at high tide, to the northward of the Sand Bar, and mangroves having taken root on it, the bank consequently increased, and the natives have planted palm trees on it. There is said to be a passage of 3 fathoms to the northward of this islet. Vessels bound to the Rio Pongo sometimes make the high land of Cape Verga, and sometimes go to the Isles de Los for a pilot, although one is not always to be found there. Some run in by their latitude, taking care to sound frequently, as soundings extend out a degree and a half to the westward. The time of high water here, on the full and change, is 9h; the rise about 10 feet.

DEMBIA RIVER is distant about 8 leagues to the south-eastward of the Pongo. It is navigable for small vessels, and is chiefly resorted to by the Portuguese for ivory. Two leagues from this is Sangaree River, and $6\frac{1}{2}$ miles to the south-westward of the latter is Point Tumbo. Immediately behind the River Sangaree is the high mountain Kakulimah which rises to the height of 2910 feet; and a few miles inland on the north shore of the river is Mount



Mt. Kakulimah E. $\frac{1}{2}$ N. (mag.) 20 miles.

Soumba or Tkit-chin, which is 1705 feet high. These mountains can be seen all along this part of the coast, and are considered to be good marks when making the land.

ISLES DE LOS.—These islands are about 16 miles to the southward of the River Sangaree. The largest is named Tamara, and is the most western of the group. The easternmost, on which the English factory was established,

lies nearly north and south, and has a high wood-crowned hill at each end, which gives it the appearance of two islands at a distance. Crawford's Island lies between the two former, and three smaller islets to the southward complete the cluster. Tamara may be seen 7 or 8 leagues in clear weather; it is moderately high, and thickly wooded, in shape resembling a crescent, its concavity to the S.E. forming several good anchorages of 4 to 6 fathoms. These roadsteads may be entered either from the northward or the southward, giving the points of the island a berth of three-quarters of a mile, by which the Arethusa Reef, extending a quarter of a mile from the north point, will be avoided. Fresh water may be had in abundance, from a spring near the principal anchorage.

The easternmost, or Factory Island, is $4\frac{1}{2}$ miles in length; the roadstead is on the eastern side, and is very safe in dry weather; but during the rainy and tornado season there is little security beyond that of the goodness of your cables and anchors. The English establishment now extends to Crawford's Island, which is considerably elevated; from the N.E. of this island are shoal flats extending to the distance of nearly two miles, they are one mile in breadth, and dry, on the outer edge, at low water; in every other respect, except Cooper's Rocks off Shark Island, the channel through the islands is perfectly safe.

The ISLES DE LOS are excessively commodious for trade, being most easy of access, and commanding a communication with the numerous rivers in the vicinity of the coasts. Good fishing may be found about all the islands with the seine, and an abundance of turtle, with good fresh water. From hence Sangaree Mount is plainly seen in a northerly direction. It may be an useful remark further to observe, that, north of the islands from the Gambia, the soundings are all sandy, which change immediately to mud on the south.

DIRECTIONS FOR SAILING FROM CAPE ROXO TO THE ISLES DE LOS.—By the Baron Roussin.—“A vessel starting from a point at $4\frac{1}{2}$ leagues to the westward of Cape Roxo, which will be a little without the meridian of 17° W. to the parallel of $10^{\circ} 40'$ N. will be outside of all dangers. From hence a course S.E. $\frac{1}{2}$ E. (S. 68° E.) and distance 68 leagues, will lead her to the west point of Tamara Island. On this course the soundings will never be under 8 fathoms until near the shore of the island, and those on the first course will be considerably more. From the parallel of Cape Roxo to that of the western breaker $11^{\circ} 31' 32''$ N., at a distance of more than 4 leagues to the westward of the meridian of 17° the depth will increase progressively from 8 to 28 fathoms, and the bottom be entirely of mud. This remark may be depended on to shew that a vessel is not far to the southward of the parallel of the Jeba, or Great Channel; she cannot, at the utmost, be more than ten miles from the positions already given.

From this point, as far as the parallel of $10^{\circ} 40'$ N., the bottom is nearly free from mud, and on passing to the southward of the parallel of $11^{\circ} 20'$ very slight traces of it remain, but are succeeded by a bottom of fine white sand, sand and gravel, sand and broken shells, with a depth varying from 12 to 50 fathoms. A vessel having left Cape Roxo and arrived in latitude $10^{\circ} 40'$, may thence steer a direct course for the Isles de Los.

The S.W. edge of the Bissagos follows a gentle curve, from the western breaker as far as the southern one, that of La Bayadere. The bottom in this part presents a singular peculiarity. Amongst the fine white sand, sand and broken shells, sand and gravel, of which it is most frequently composed, a greenish coloured sand is sometimes found. The depth decreases very gradually from 50 to 9 fathoms, from S.W. to N.E. The remainder of the

course to the Isles de Los passes over deep soundings, as much as 50 fathoms, at the point of departure, and the least depth is 12 fathoms.

No precise rule can be given as to the changes in the depth along this track, nor as to the various nature of the bottom. It is known only that the ground, in the space passed over by this course, seems to be furrowed with channels, which, commencing from the southern extremity of the eastern channel of Bissagos, diverge toward different points between S.W. and S.S.E. *true*. The furrows above mentioned appear to have been caused by the regular tides in the mouth of the Rio Grande, and prove, beyond a doubt, that the outlet of the same channel is partly caused by that river. With respect to the nature of the bottom, it is of fine sand, in some places mixed with broken shells, small pieces of brittle rock, and gravel, which appeared to be only a covering to beds of a whitish volcanic sandstone, into which the lance penetrated but three or four inches, and did not hold. A muddy bottom is not found until about 10 leagues to the westward of the Isles de Los, and then only in small quantity, till within a very short distance to the N.W. of those islands.

TIDES.—In proportion to the distance from the mouth of the Jeba, or Great Channel of Bissagos, either to the northward or southward, the tides lose their regularity. This interruption in the tides is evident in going to the southward, as at a few miles south of the parallel of the western breaker $11^{\circ} 31' 32''$ N., they are no longer perceptible, even on the edge of the Bissagos. No decided course of the current was ascertained to exist, but it is generally allowed that the waters have a greater inclination to flow to the southward than to the northward; and it may be presumed that it follows the direction of the winds on the western edge of the Archipelago, but it is seldom found to be considerable."

COAST CONTINUED.—Between the Isles de Los and the sharp low point of Tumbo, there is a safe channel, through which ships may carry 3 fathoms of water, and which may be at times highly convenient to use, or even to run through the group; yet, without some good reason for so doing, it will always be advisable to go outside the islands, where certainly no dangers are to be met with.

From Tumbo Point to Matacong Island the bearing and distance are S.E. by S. $7\frac{1}{4}$ leagues. Tumbo Point is the S.W. extremity of an island bearing the same name, and separated by a narrow high-water channel from the main land. To the southward of this point, the land falls back to the north-eastward about 7 miles, forming an extensive but shallow bay, at the bottom of which is an inconsiderable stream, named Tannaney River. In the extensive bay between the Isles de Los and Matacong Isle, no detached dangers exist. The coast is safe to approach, the soundings being gradual, and always affording good anchorage; and it is in all parts accessible to large ships, to the distance of 6 miles, which generally may be considered sufficiently near to distinguish the land, and often to recognise the mouths of the rivers.

Mahneah River is about 12 miles E.S.E. from Tumbo Point; it is at low water, scarcely accessible to the smallest coasting vessels, but the rise of tide exceeds 2 fathoms. To enter this river, it is necessary only to bring the western point of the entrance, while at the distance of 5 miles from it, to bear N.E. by E. $\frac{1}{4}$ E. and then steer toward it in that direction, until you get close to the S.W., mud bank, when you may proceed along by the edge of that bank, in a convenient depth, according to circumstances. Within the river, the depths at low water are from 6 to 10 feet only. The water discharged from this river must be very great, as the ebb tide runs out with *rapidity*.

RIVER MOREBLAH.—The mouth of this river is about 18 miles S.E. by E. $\frac{1}{4}$ E. from the Isles de Los, and though its breadth within the points nowhere exceeds half a mile, yet it is far superior to the Mahneah. In approaching the coast abreast of the river, with its opening bearing E.N.E. $\frac{1}{4}$ E., distant 9 miles, and Matacong Island S.E. by E. $\frac{1}{4}$ E., you will have 6 fathoms of water on black mud; from this situation the depth will decrease gradually, on a bottom of the same kind, to $8\frac{1}{2}$ fathoms at the entrance of the channel. With the rounding of the land, between the Rivers Mahneah and Moreblah, bearing N.N.E., the east point of the entrance E. $\frac{1}{4}$ N., and the middle of Matacong Island S.S.E. $\frac{1}{4}$ E., you will have that depth. From this position steer N.N.E., until the east point of the river bears E. $\frac{1}{4}$ S., and then stand in toward this point, or about East; but remembering, that both flood and ebb set partially over the extensive shoals that form the S.E. side of the channel; some of these, however, being dry at low water, and nearly so at high water, their steep boundary is perfectly discernible. In the elbow of the channel, the least depth is $1\frac{1}{2}$ fathom at low spring ebbs: this depth, however, continues but a short way, and, from the time of altering your course to the eastward, or steering straight in, you will seldom have so little as 2 fathoms. Beyond the east point, the depth varies from 4 to 6 or 7 fathoms, and for the extent of 7 miles up the river, it appeared to be clear of all danger. It is high water, on full and change days, at 7h. 40m., and spring tides rise 11 feet.

Matacong Island is about a mile in length, surrounded by mud-banks and rocks in all directions, so that no vessel of any burthen can lie at anchor within two miles of it. The channel which divides it from the main is nearly three-quarters of a mile broad, but its muddy bottom, at low water, is left dry. From Matacong Island the coast trends to the eastward a little more than 8 miles, when it turns abruptly to the northward and forms the west point of the mouth of the River Foreecarreah, the interval being fronted with sand and mud banks, which extend more than 3 miles to the southward. The entrance of this river is above 2 miles wide, and the least depth is 1 fathom at low spring ebbs. To sail in, it will be necessary to pass close to the banks which project from the west point, but at the same time to be cautious in approaching them, as they are steep-to, and dry at low water. The outer sand will be apparent, even in fine weather, at any other time than high water, and if seen, it may be safely skirted in 2 fathoms near low water, or in 4 at high water; and that you may not get in at the back of the sand, do not bring the highest part of Matacong Island to the westward of N. by W. $\frac{1}{4}$ W. until the west point of the river bears N.E. $\frac{1}{4}$ E. You may then safely enter, recollecting, as a guide, that you should always keep the western side aboard, off which, however, you will have to edge occasionally, to avoid the banks; yet this river is of very little consequence, as a ridge of rocks nearly crosses it at a short distance from its mouth. The ebb tide is here extremely rapid, and the overfalls, in the vicinity of the rocks are dangerous to those who do not possess a local knowledge of the river.

The RIVER MELLACOREE is at present of considerable importance in the timber trade, and has better objects for marks than any of those already described. In entering, observe that, at 8 miles off shore, there are 6 fathoms of water, and, with the river's mouth bearing E. by N., it will be fairly open. Steer toward it, in that direction, until the soundings have decreased gradually to about 3 fathoms, at low spring ebbs, with the following bearings:—East point of Yellaboi Island S. by E.; Sallahtook Point, distinguishable by the trees being higher than elsewhere, bearing S.E. $\frac{1}{4}$ S.; Bentee Point, known by a remarkably large tree, E. by N.; the outer point of Tanah River, E.N.E.

$\frac{1}{4}$ E.; and the rounding of the land, to the northward of the river, N.E. $\frac{1}{4}$ N.; you will then be in the fairway. The *Middle Ground* is steep and dangerous, but the soundings on the southern side are gradual, though the mud-bank is very wide; borrow, therefore, rather on that side, until nearly as far as Bel-langsang point, when you must haul over to the mouth of Tannah River, and there anchor. Higher up there are some patches of rocks in the middle of the river, but at low water they are seen, as well as the deep water-channel between them, which is one-third of a mile in breadth, with a depth of 7 to 9 fathoms. By keeping the east point of the River Tannah bearing N.W. by W. $\frac{1}{4}$ W., you may pass through this channel in safety; and there being no further danger, you may ascend the river to the factories established below Devil's Island, on the south shore; the general depth varies from 5 to 9 fathoms. Here it is high water, on full and change days, at 7 hours 40 minutes; spring tides rise 11 feet.

Besides the channel on the south side of the Middle Ground, there is also an inferior one to the northward; to enter which, when 5 or 6 miles off shore, bring the west point of Tannah River to bear E. $\frac{1}{4}$ S., and by carefully using the lead you may proceed in with safety; for, although at its termination, it takes a slight turn round the N.E. corner of the Middle Ground, yet this is generally so well indicated, that you can scarcely be deceived. On account of the soft nature of the bottom, vessels may ground in several places in the vicinity of the Mellacoree River, without being injured; but a patch of foul ground which surrounds the long reef off Sallahtook Point, must be carefully avoided.*

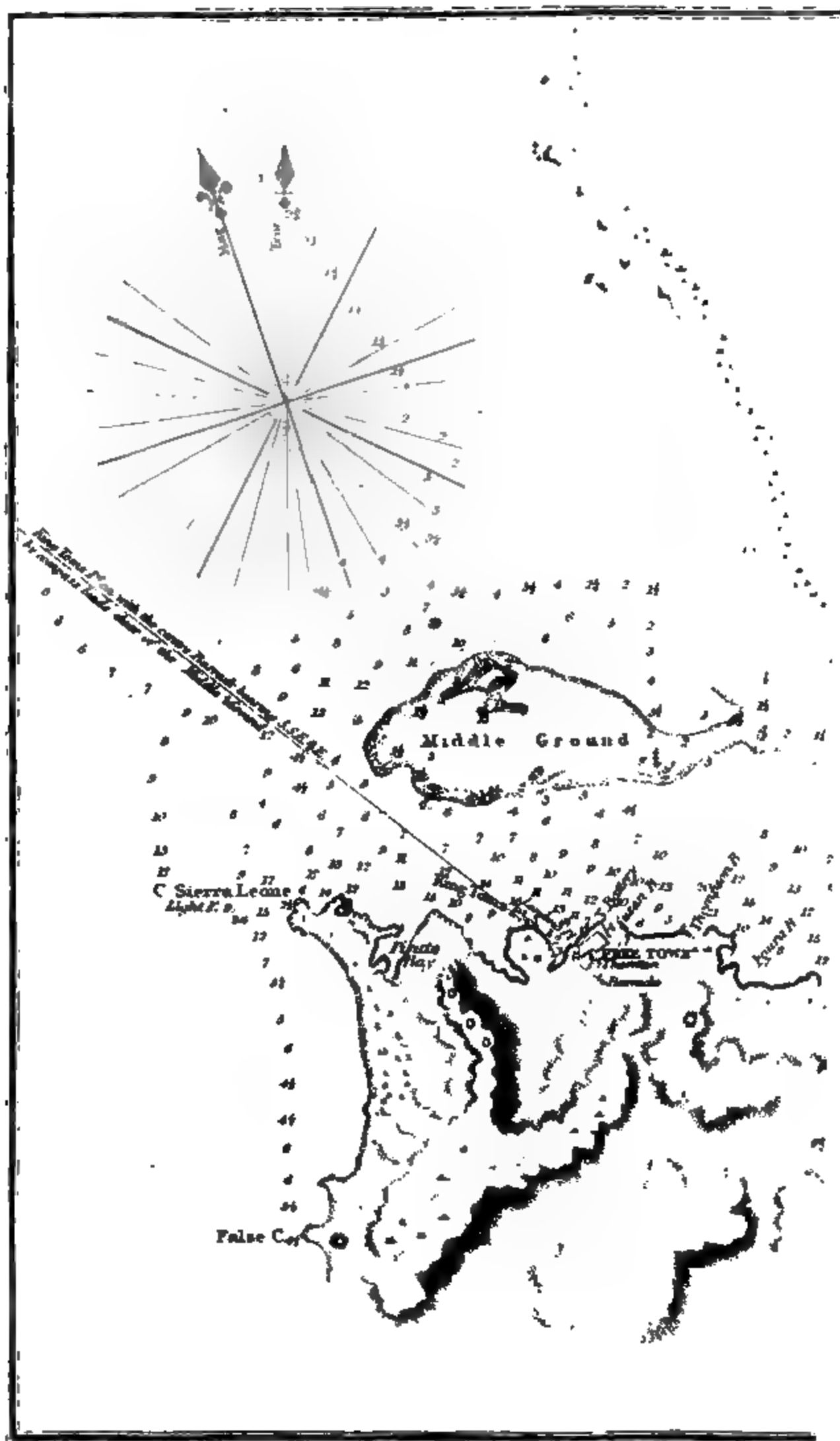
From Sallahtook Point the coast trends S.S.E. 7 miles, to a small river, on the western point of which is situated Sangahtook factory; and about $1\frac{1}{2}$ mile to the westward of this point is Yellaboi Island, surrounded by mud-banks that are dry at low water. Four miles S.E. from Yellaboi is a much larger island, with extensive mud-banks to the north-westward, but with a deep channel between it and the main. It is named Corteemo, and lies in the mouth of the Rivers Scarcies. These rivers are known by the names of Great and Little Scarcies; the former is navigable for large ships, but the other is adapted to very small vessels only, and requires very careful pilotage.

SCARCIES RIVERS.—The channel into the Great Scarcies River† is the best on this part of the coast; for, although the banks are steep, yet it is broad and deep, and a ship of the line, by taking a proper time of the tide, might moor off the inner point of Yellaboi Island. To sail into this anchorage, bring the west end or highest part of Yellaboi Island to bear E.N.E., and steer toward it in that direction, until you decrease the depth to 5 or 4 fathoms, which will happen suddenly. Now change the course, and keeping in 4 to 5 fathoms, steer direct for Inglis Pahboyeah River, bearing E. $\frac{1}{4}$ N., taking care to keep it well open of the inner point of Yellaboi Island, until

* A pilot should always be taken for the rivers on this coast, if one is at all to be had. See note at foot of page 125.

† This channel has been buoyed (1832),—the expense borne equally by Mr Henry Weston and myself. The bearings of the inner or bar buoy are to the west end of Yilleaboyah, N. 2° W., and to where the huts are on the east end, E. $\frac{1}{4}$ N., compass bearing. The outer buoy is situated on the northern edge of the outward middle bank. The inner buoy is situated on the shallowest part of the bar, having at high water, common tides, 16 feet; but at the distance of a quarter of a mile, due north from the buoy, there are $3\frac{1}{2}$ fathoms at high water, common tides. The earliest opportunity shall be taken to remove the inner buoy farther north, which will render the channel safe for vessels drawing 16 feet water, at common tides, and 18 to 19, at high water, spring tides. If you apply the bearings to the chart of the Scarcies, they will give the place of the inner buoy one quarter of a mile further in, as above. In a line with the west point is where I purpose to lay it, in $2\frac{1}{2}$ fathoms, low water.—John MacCormack, Agent to Lloyds.

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Scale of Nautic Miles



SIERRA LEONE RIVER.

By Lieut. Richd. Owen.

Position of the Citadel

Latitude $8^{\circ} 29' 7''$ N.
Longitude $13^{\circ} 14' 3''$ W.

The west point of that island bears N. by E. $\frac{1}{4}$ E., when you must haul directly in toward it, and, skirting along the steep mud-bank which borders the south side of the island, steer for its S.E. point, close to which you may anchor in $4\frac{1}{2}$ fathoms. In reaching this anchorage, the least depth you will have to pass over will be $2\frac{1}{2}$ fathoms at low spring ebbs; and this occurs only after hauling in for the island, and running along the edge of the mud-bank. It is high water here, on full and change days, at 7h. 10m., and spring tides rise 11 feet.

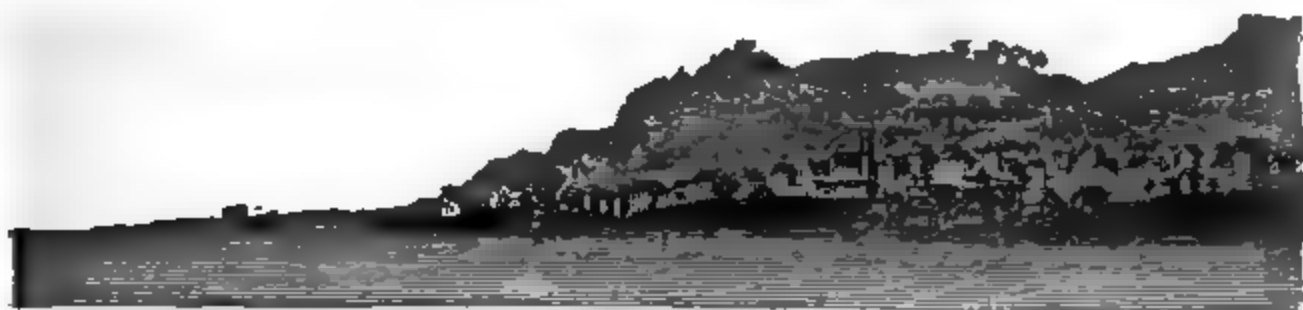
SIERRA LEONE, the most important settlement on this part of the coast, may be represented as a peninsula, extending from the Sierra Leone to Kowry Bay, which consists of an irregular mass of peaked mountains, with valleys and prairies lying between them. The mountains are covered to their summits with lofty forests, which give the scenery a beautiful, rich and romantic appearance. The river which forms its eastern boundary is a noble estuary extending 20 miles inland, varying in width from 10 miles at its entrance, to 4 where it terminates. The settlement was formed in 1787, with the view of commencing the introduction into this part of Africa of the benefits of European civilization. It has been largely colonized by Maroons and Negroes from America and the West Indies, and captured slaves; and in 1833, contained 29,764 inhabitants; but its prosperity has advanced very slowly, and, so far as regards the objects originally intended, the settlement may be pronounced a failure. Throughout the peninsula there are several villages; but the capital is Freetown, at the northern extremity, a well-built place, with regular and spacious streets. The settlement has long laboured under the imputation of extreme unhealthiness, and has been called "the white man's grave," but it has of late years very much improved in this respect, and is, indeed, now represented as not more unhealthy than any other place within the tropics, Europeans being indebted for their great mortality more to their improper manner of living than to the character of the climate.

The coast to the northward of Sierra Leone as far as Yellaboi Island, a distance of 25 miles, is exceedingly low and flat, and bordered with a shoal bank 3 to 6 miles in breadth, which has upon it several dangerous rocks. On the south side of the river the land is higher, as the cape is the termination of a range of lofty hills named the Sierra Leone, or Lion Mountains, which have given name to the river and country. At the extremity of this cape there is a lighthouse 69 feet high showing a fixed light, which is a good mark for vessels approaching the river in the night-time. From this lighthouse the exact bearing of the Carpenter Rock is stated to be W. $13^{\circ} 7'$ S. (true).

The mouth of the River Sierra Leone is obstructed by an extensive sand-bank, named the Middle Ground, which in many parts is dry at low water, but having on each side a passage; that on the north, however, is only fit for very small vessels, in a depth, at half a mile from shore, of 2 and 3 fathoms. The principal channel is that between the Middle Bank and the cape, which is fit for vessels of every burthen, as it varies in depth from 5 to 10 and 12 fathoms, and is about two miles in breadth.

The Carpenter is a dangerous rock, lying at the distance of nearly a mile W. $\frac{1}{4}$ N. from the N.W. extremity of the cape. This rock is clearly seen at half tide, and may always be distinguished by the breakers over it; the flood stream sets directly through the channel formed by it and Cape Sierra Leone; and though the rock may safely be approached within half a mile, yet it will be proper for those beating down the river, with the sea breeze and a strongebb tide, to be careful and not approach so near.

On the starboard side of the River Sierra Leone, the coast is indented with several inlets, respectively named Cape, Pirate's, Whiteman's, St. George's, or Freetown, Susan's, and Thompson's Bays; the latter of which is bounded on the east side by Farran Point. *Freetown*, the capital of the colony, stands on the bay of that name, and is protected by Fort Thornton, which stands on the highest ground in its immediate neighbourhood, except that on which the Martello tower is erected at a distance of a quarter of a mile. The town is situated at the foot of the range of mountains already noticed, whose general height is estimated from 2000 to 3000 feet.



Freetown, Sierra Leone (seen from the Anchorage).

Ships proceeding from Cape Verd to Sierra Leone, and having reached the latitude of $9^{\circ} 15' N.$, should endeavour to gain soundings on the edge of the great bank from the Bissagos to Cape St. Ann. From a depth of 50 fathoms, grey sand, you may steer a *true* course S.E. by E., until you arrive in the parallel of the cape, in $8^{\circ} 30'$, from whence an East (*true*) direction will enable you to distinguish the mountains of Sierra Leone, which are often seen at a distance of 14 leagues, though, in hazy weather, very prevalent on this coast, they are often invisible 6 or 5 leagues. It is recommended to make a constant use of the lead, when approaching towards the entrance; should the depth gradually vary from 20 towards 14 or 13 fathoms, and suddenly shallow to 7 or 8 fathoms, you will not be more than 3 leagues distant; and should this happen towards evening, it will be better to anchor till daylight. Proceeding as we have thus directed, and having made the high land Sierra Leone, you should bring it to bear E.S.E. $\frac{1}{4}$ E. (East.) The cape makes in a small low point, having a ridge of cocoa-trees close to the water's edge; and when within 3 leagues of the cape, you may observe the Carpenter Rock, with the sea constantly breaking over it. Having passed the cape within a quarter of a mile, in 9 or 10 fathoms, a S.E. by E. $\frac{1}{4}$ E. (E. $\frac{1}{4}$ S.) course, $8\frac{1}{4}$ miles, will carry you to Freetown, where there is anchorage in 14 or 15 fathoms, muddy bottom, a quarter of a mile from shore, with Fort Thornton bearing S. by W.; the east point of the bay S.E. $\frac{1}{4}$ E.; and the west point, named King Tom's Point, W. by N. Moor with the best bower to the eastward. The watering-place here is very convenient, and the water excellent.

If approaching from sea you will probably endeavour to strike soundings on the parallel of $8^{\circ} 30' N.$ In a depth of 9 or 10 fathoms you will be at the distance of 3 or 4 leagues from the shore, and should bring the Lion Mountains to bear E.S.E. when you may proceed as previously directed.

As the lighthouse on Cape Sierra Leone bears from the Carpenter Rock E. $\frac{1}{4}$ S., and from the western end of the Middle Ground S.W. $\frac{1}{4}$ S., vessels should be careful when coming from the westward not to bring the light to bear more to the eastward than E.S.E. $\frac{1}{4}$ E.; and if coming from the southward, not to alter course until the light is on that bearing. If from the northward, the light should not be brought more to the westward than S.S.W.

$\frac{1}{4}$ W., until King Tom's Point comes in one with the centre barrack, S.S.E. $\frac{1}{4}$ E., by which means the Middle Ground will be avoided.

In approaching the river by night, it is advisable to anchor in order to make sure of your position, as the tide and current sometimes combine in sweeping you out of sight of the land before morning, or even into the dangerous vicinity of the St. Ann Shoals.

In sailing up the river, do not approach nearer the Middle Bank than 7 fathoms. Farran Point is high, and has a house upon its summit; it has sometimes, in hazy weather, been mistaken for Cape Sierra Leone, although the cape is nearly 2 leagues to the eastward; the consequence of which has been, that vessels have touched on the Middle Ground. If this point is brought to bear S.E. by E. $\frac{1}{4}$ E., when it will be well open to the north of the cape, it will point out the mid-channel between the Middle Ground and the Carpenter.

If intending to proceed beyond Freetown a pilot must be obtained, the river, at 5 miles from the town, becoming very intricate.

The *Tide* at Freetown, flows on the full and change days at 7h. 50m., and rises $12\frac{1}{4}$ feet. During the rainy season, the tide is very regular and strong, running 6 and 7 knots an hour, and the ebb sets rapidly on the Middle Ground. In the dry months, it commonly flows on shore at 7h. 30m., with $7\frac{1}{4}$ hours' ebb, and $4\frac{1}{4}$ flood. In this season the ebb runs $2\frac{1}{4}$ miles an hour, the flood only 2 miles.

FALSE CAPE bears S. by W. $\frac{1}{4}$ W. from Cape Sierra Leone, distant about 4 miles, and is situated to the southward of a slender sandy bay, bordered with trees. The cape is a conspicuous projecting point. From False Cape to York, or the Sisters' River, the coast trends S. $\frac{1}{4}$ E. 12 miles; and from York to Cape Chilling S. $\frac{1}{4}$ W. 7 miles. At Cape Chilling the chain of Sierra Leone mountains terminate, after having made a high double land, which is seen a great way off. The cape itself is low, covered with trees, and appears, at 3 or 4 leagues distant, like a small island; but the interior, or south extremity of the range of mountains, is extremely high, and may be seen a distance of 14 or 15 leagues.

The BANANA ISLANDS are separated from Cape Chilling by a channel 2 miles in breadth, and are chiefly foul and rocky. A vessel may anchor to the northward of them, with the N.E. extremity of the group bearing S.S.E. $\frac{1}{4}$ E., and the western part S.S.W.; here there is a depth of 7 and 8 fathoms towards the island, but little more than 2 fathoms, a cable's length from shore. There is also anchorage to the southward; but the best position is in 5 fathoms, 2 miles from shore, on clayey ground, the N.E. point bearing S. $\frac{1}{4}$ E., and the highest hill S. by W. $\frac{1}{4}$ W. The best landing-place is in a sandy bay, at the S.W. end, where wood and water may be obtained.

YAWRY BAY is formed by Cape Chilling on the north, Tassa Point on the south, distant from each other 6 leagues S.S.E. and N.N.W. This bay is encumbered with a shoal which stretches 4 miles from the coast, many parts of which dry with the ebb, and have little more than 4 feet at high water. The Plantain Isles and Bengal Rocks extend 5 miles to the westward of Tassa Point, on the flat between Yawry Bay and Sherbro' Inlet.

TIDES.—The tides off the False Point of Sierra Leone. To the northward of that point, the flood runs to the northward; to the southward of that point it sets to the south. Hence, at the Bananas, the flood is from the N.W., and the ebb contrary. Here the tide flows, on the full and change days, at 8h. 15m. During the equinoxes, it rises 9 or 10 feet perpendicular; other spring tides, 8 or 9 feet. At the Plantain Isles, it rises about a foot and a half more

than at the Bananas ; but at the Bashaw or Turtle Isles, more to the southward, the rise is 6 or 7 feet, common spring tides.

SHERBRO' INLET is the channel between the main and Sherbro' Island, the western extremity of which is named Cape St. Ann. The main land forms the north side of the inlet, and consequently the north side of the island forms the south side. From the extremity of the north side, the coast bends somewhat to the S.S.E. to Yaltucka River, and is encumbered with a mud-bank and several shoals, as far as the River Bagroo, which is 6 leagues farther. The north side of Sherbro' Island extends 8 leagues to Jamaica Point, the eastern extremity, and the coast between is bordered with an extensive mud-bank. About 4 leagues from Cape St. Ann, on this side of the island, is, or was, the remarkable tree named Little Pow Grande ; and $3\frac{1}{2}$ miles to the eastward of this spot is Pow Grande. Jenkin's Village is distant $4\frac{1}{2}$ miles from the latter, and affords anchorage for large vessels in 5 to 7 fathoms.

Vessels bound to Sherbro' Inlet should steer from the west end of the Bananas, toward the Bengal Rocks, S.S.E. $\frac{1}{4}$ E. (S.E. $\frac{1}{4}$ E.) 14 miles, so as to give them a berth of about 3 miles. Having rounded these rocks steer S.E. $\frac{1}{4}$ S. 5 leagues, taking care to avoid the hard sand bank on the east, which is steep-to. In running on, you may shoalen your water to 4 fathoms, on the flat of Yaltucka River, upon the eastern side, and thence continue the same course 4 leagues farther to the southern bank, making due allowance for tide, whether ebb or flood. The last course will lead to a mile and a half from shore, in about 4 fathoms of water, and without the edge of the bank. You may now run up along shore, for 2 leagues, to Jenkin's, taking care to avoid the edge of the middle ground on the north, which here leaves a channel of only half a mile between it and the shore.

THE BASHAW, OR TURTLE ISLANDS, consist of eight or ten in number, and are situated on a great bank, extending to the N.W. of Sherbro', and S.E. to the Shoals of St. Ann. The bank on which these islands lie is intersected by numerous channels, which are navigable for boats at high water, but are so complicated as to render description useless, and indeed of no utility.

THE SHOALS OF ST. ANN.—The limits of the bank on which these shoals exist are but yet imperfectly known. The best authorities consider the northern extremity to lie in latitude $7^{\circ} 58'$; the south extreme, $7^{\circ} 31' 5''$; and the western limit, $7^{\circ} 48' N.$, longitude $13^{\circ} 29' W.$ They are divided by numerous channels, varying in depth from 6 to 10 fathoms. A narrow passage of this nature divides St. Ann's Bank from that on which the Turtle Islands are situated ; but this, like the others, should not be attempted with the imperfect description we are at present in possession of. As a general caution to vessels bound from Sierra Leone towards the Gulf of Guinea, we should recommend a S.W. $\frac{1}{4}$ W. course, 43 miles ; and having reached the latitude of $7^{\circ} 56'$, in the meridian of $13^{\circ} 44'$, a course S.S.E. $\frac{1}{4}$ E. will take you clear to the southward of all the shoals.

About 60 miles from the River Shebar, on the coast to the eastward of Sherbro' Island, is the River Gallinis, and from hence to Cape Mount, the coast is very low, with a fine sandy beach, and covered with trees.

CAPE MOUNT is of considerable height, and may be seen 25 to 30 miles off. It consists of several hills which rise to the height of 1060 feet above the sea, and bears from a distance considerable resemblance to an island. The western point of the cape is in lat. $6^{\circ} 44' 25'' N.$ and long. $11^{\circ} 23' 15'' W.$; and the base of the mount, from thence for 3 miles to the south-eastward, is formed by a succession of rocky points and small sandy bays.

There the coast again sinks into a low continuous beach of light brown sand; one universal forest prevailing over the entire face of the country up to the summit of the cape, and extending without intermission to Cape Mesurado.



Cape Mount, bearing E., distant 10 miles.

To fall in with Cape Mount, you ought to keep in the latitude of $6^{\circ} 40'$, having on account of the current, which sets toward the shore, frequent recourse to the lead, when you think yourself near the land. In the night, you ought not to approach it nearer than to 26 fathoms, unless well acquainted. The roadstead lies to the westward, where you may anchor in 10 to 15 fathoms, bringing the extremity of the cape to bear South, or S. by E. In fine weather, vessels may ride securely between Cape Mount and the river of that name to the north-westward; but in the rainy season, during southerly and south-west winds, there is a tremendous sea and breakers on the shore, so that, during these months, vessels should lie well out, as otherwise it may be difficult to get to windward.

CAPE MESURADO is high, and distant about 43 miles S.E. by S. from Cape Mount; the coast between is low, having a white sandy beach. At the distance of 2 miles from the shore is a depth of 10 fathoms. Vessels may lie in any depth from 5 to 15 fathoms, off the River St. Paul, which lies about 8 leagues to the northward of Cape Mesurado; there is also anchorage in 10 to 15 fathoms, muddy ground, with the cape bearing about S.E. by S., distant 2 or 3 miles. The rainy season, between Cape St. Ann and Cape Mesurado, usually commences about May, and terminates in October; it is generally accompanied with thunder and lightning, and the sea sets so hard to the N.E. along the shore, as to cause a most violent surf on the shore.

Cape Mesurado is an elevated promontory, almost perpendicular on the north side, but with a gradual declivity towards the sea on the south. There are regular soundings, of 20 to 15 fathoms, muddy bottom, at 8 miles off shore, along which the current sets strongly. At 2 or 3 miles off shore, with the cape S.E. by S., is a depth of 15 to 10 fathoms, muddy bottom, and a common anchorage. With the cape bearing N.E., the land appears like an island, with trees rising out of the water to the north; and at 7 leagues off, it appears in its insular form, the land on each side being very low. In the winter months here, as at Cape Mount, vessels should lie out, on account of the heavy sea in the bay, and the southerly winds, which would otherwise render it very difficult to get out to windward. To anchor at the cape in the rainy season, bring the mount to bear S.E., distance off shore 3 or 3½ miles, and come to in 14 fathoms of water.

On Cape Mesurado there is a lighthouse showing a revolving light of a red colour. It is at the height of about 240 feet above the sea.



Cape Mesurado, bearing E. by S., distant 7 miles.

At about 30 miles to the S.E. by E. of Cape Mesurado is the River Junk, which may be known by a remarkable hill, in the shape of a saddle, lying inland. Vessels may anchor in 15 fathoms, clear sandy ground, with the entrance of the river bearing N.N.E., and the saddle hill N.E., distant 4 miles from the shore. This will be found convenient during the rainy season; but in fine weather, you may lie nearer the shore, in 12 fathoms. Fresh water may here be obtained, but caution must be observed with the inhabitants, who are not so friendly as those to the northward. There is said to be a small reef, close in shore, at 6 miles to the westward from the mouth of the river.

The Little Bissaw, or Picaniny Bassa, is distant about $3\frac{1}{2}$ leagues S.E. from the River Junk, and has a dangerous reef, that extends 5 miles to the S.E.; vessels therefore should not anchor in less than 16 fathoms. Two and a half leagues from Little Bissaw are the Nine Trees and Bullam Town, the former being an excellent mark for this part of the coast. The anchorage off Picaniny Bassa is with the Nine Trees bearing S.E. by E., and a large and remarkable house, the residence of the chief, N.E. by E.

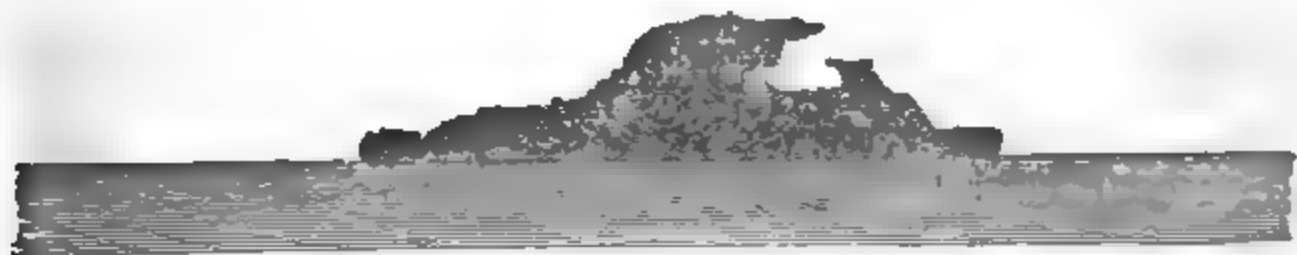
Between Cape Mount and Bassa, the trade of the coast has generally been a mere system of barter, named the Bar Trade, from the value of all merchandise being estimated at so many bars of iron. Ivory is the staple commodity, as well as a fine species of cam-wood. Those who possess ivory, being anxious to trade, readily come off in canoes, provided the vessel comes to; but great caution is required. Your intention to trade should be signified, on arrival, by firing a gun and hoisting your colours, on which the natives will come off; fires will be made on the beach, by which their desire to trade is indicated.

To the eastward of Bullam is the River St. John; about 2 miles to the southward of which is the town of Grand Bissaw, a place of some trade, situated in a small safe cove of 6 to 8 fathoms, and bounded on the west by two large rocks above water, between which and the shore a vessel may moor in case of necessity, in $2\frac{1}{2}$ or 3 fathoms. The anchorage of Grand Bissaw, in the rainy season, is in $15\frac{1}{2}$ fathoms, rough blue marl, with the Nine Trees bearing North, distant 6 miles; in the dry season anchor nearer shore in 12 fathoms.

Somewhat better than 2 leagues to the southward of Bassa Cove is Tabocanee Rock, distant about 2 miles from the village of that name, on the shore: a reef extends from the rock nearly six miles to the westward, between which and the shore there is a navigable channel for boats only. The distance from Grand Bissaw Point to the River Sesters is about 40 miles, the coast between is generally foul, and requires light chain cables for anchoring; several villages distinguish this part of the shore, one of which, Grand Currow, may be known by a high hill inland to the N.E., and that of Manna by a

clump of high reddish trees. The River Sestros, or Sesters, is recognised by a hill in the interior, and the land appearing double; it is only fit for boats, as its entrance is impeded with rocks 2 miles from shore. The anchorage is in 10 fathoms muddy bottom.

At $2\frac{1}{2}$ leagues from the River Sestros is the rock of that name, known by several others around it, and a palm tree on the point; 3 leagues farther is Sangwin, distinguished by the Devil's Rock, with a bushy clump on the top, distant 2 miles from the town, to the southward of which there is anchorage. A short distance to the south-eastward of Sangwin is the Tassou River, having before its entrance a rock named La Pierre Percée, or the Pierced Rock.



La Pierre Percée, bearing E.S.E.

From Sangwin to Settra Krou, a distance of 36 miles, the coast is generally foul, and affords but partial anchorage. The towns of Baffa, Battoa, Tassou, &c., which lie in this space, are unimportant. To the southward of Settra Krou is Krou Settra, before which there is anchorage in 15 or 16 fathoms, sandy ground: this place may be known by its high bare trees, appearing like masts; but in approaching be careful to avoid a dangerous reef, extending $3\frac{1}{4}$ miles from the shore, bearing, in a line with the town, E.N.E. Six miles from this shoal is the Swallow Rock, under water, lying off Wappou, from which it bears S.W., $2\frac{1}{4}$ miles. Wappou has a single tree on the beach, and has a large rock lying to the westward, named Flat Isle. Niffou, Drou, and Baddou lie to the southward, and afford some trade in ivory, but the coast hereabout is foul.

We now reach the town of Grand Sestros, or Sesters, distant 15 leagues from Settra Krou; this is a populous place, and may be known by a large single tree on the beach, and a high round rock $2\frac{1}{4}$ miles to the southward. There is anchorage, in 20 fathoms, 4 miles to the southward of Garraway, a town situated 7 miles to the south-eastward of Grand Sestros, which may be known by three hills on the west, and a clump of trees on the extremity of its southern point. Rock Town, situated $3\frac{1}{4}$ leagues from Garraway, takes its name from a reef extending from it some distance, which is partly above and partly under water; between this and Cape Palmas is Cape Palmas Little Town, a larger one of that name lying near the pitch of the cape. The coast hereabout is foul, and the depths irregular, so that it may be proper for vessels not to approach nearer than 20 or 25 fathoms.

CAPE PALMAS is a rocky peninsula joined to the main by a low sandy isthmus. Its eastern end is covered with a collection of native houses, and there is also a settlement on it named Harper. On the pitch of the cape there is a lighthouse, showing a fixed light. On the north side of the peninsula is the entrance to the Palmas River, on the bar of which there are 3 feet water; and from the extremity of the cape some dangerous rocky patches extend about three-quarters of a mile. Immediately off the cape there is a small island 43 feet high, named Russwurm Island.

At about 6 miles to the westward of Cape Palmas are some dangerous

shoal patches, the outermost of which is $5\frac{1}{2}$ miles from the land. They are extremely dangerous and should not be approached nearer than a depth of 26 fathoms, which will be at about a mile outside of them. One of the shoals, named the Coley, is a mere pinnacle, having on it only 6 feet, and close round it 10 to 12 fathoms; from it Cape Palmas bears E.S.E., $9\frac{1}{2}$ miles; Rocktown Point, E. by S., $5\frac{1}{2}$ miles; and Kablah Hill, E. by N., 8 miles. Within the Coley Rock, between it and the shore, is the Cape Shoal, a ledge of rocks always visible, as upon it the sea breaks with considerable violence; and from Fishtown Point a ledge of rocks also extends off, all which contribute to render the navigation of this part of the coast extremely dangerous.

If bound to Cape Palmas with a leading wind, you may safely pass inside the Cape Shoal, which is always distinguishable by its breakers; and by keeping nearly mid-channel between it and Fishtown Reef you will have 7 fathoms. At night it will be advisable to pass outside of all the shoals, with Palmas Light, E. $\frac{1}{2}$ S., or E. $\frac{1}{4}$ S., or if the light be not seen, in 25 or 30 fathoms.

As a general caution to vessels running down this coast during the night, it is recommended not to approach nearer than 18 fathoms between Cape Mount and the River Sestros; between the latter and Settra Krou, it may be proper not to get into less than 20 fathoms, and from thence to Cape Palmas, 22 fathoms; but in approaching the latter, observe what has already been stated, not to get into less than 28 to 25 fathoms, in order to avoid the dangers we have described.

To the eastward of Cape Palmas with the lighthouse bearing N.W. $\frac{1}{4}$ N., distant 4 miles, is a patch of $3\frac{1}{2}$ fathoms, on which H.M.S. Athol struck in 1830. Its distance from the shore is about 2 miles, and from it Growa Point bears East, 3 miles; a round rock above the water, E. by N.; and a clump of trees on the eastern extreme of the land, E. $\frac{1}{4}$ S. On each side of it are 10 fathoms.

At 7 miles to the eastward of Cape Palmas is Growa Point, from which a reef extends to the westward about $1\frac{1}{2}$ mile, and causes the sea to break at all times with considerable violence. At night no vessel should approach the rocks nearer than 15 fathoms.

At about 11 miles to the eastward of Cape Palmas is Cavally, a river and town distant 5 miles from Gruway, a little town which lies 6 miles to the eastward of the cape. Cavally stands on the eastern bank of the river, off which there is anchorage in 18 or 20 fathoms, but the river itself is only navigable for boats. This place may be known by the two points of the river's mouth, which is wide and barred; though, in coming from the westward, you will not perceive the river till you are nearly to the S.E. of it. To the eastward of Cavally, as far as Growa, the land in general is even, but near the latter it appears double, and from thence to Tahou it rises considerably. Growa may be known by some rocks and breakers before it, and has a roadstead of 20 fathoms, good ground. Two leagues E.S.E. from it is Tahou, a low flat point, which appears beyond two hummocks on the beach, projecting into the sea, with breakers over it, 2 miles from which vessels may ride in 15 fathoms.

The land to the eastward, as we have observed, is much higher; but particularly as we approach within 5 or 6 leagues of Tahou, where it appears more elevated than any other part between it and Cape Mount. Tahou is a town of some importance; there is good riding before it in 12 to 14 fathoms; but care must be observed not to approach the shore, which is rocky. The River *St. Pedro* lies to the eastward of Tahou; and $2\frac{1}{2}$ leagues farther, in the same

direction, is Bereby, to the southward of which is the Devil's Rock, connected to the shore by a ledge on the west side.

ST. ANDREW'S BAY.—To the eastward of Tahou is the bay thus denominated, which may be distinguished by an elevated part of the coast to the westward, named the High Land of Drewin, a rocky shore, having rocks extending 2 miles into the sea. The western point of St. Andrew's River is named Swarton Corner, a bluff point, with two large round-topped trees, appearing about a league to the west above the land; with these trees bearing N.W. by W. you may anchor in 9 to 12 fathoms, fine sandy bottom with three high hills appearing in one, 5 leagues inland. Behind Swarton Corner wood and water may be obtained, but for this accommodation a *douceur* or dash must be presented to the chief. St. Andrew's River is one of some magnitude. To the eastward of St. Andrew's, the coast has a picturesque appearance, being lined with trees of various colours; it is in general low, and has a sandy beach. The River Frisco, or Lagos, is distant about 10 leagues to the eastward of St. Andrew's; here water may be obtained, and ivory bartered for. Seven leagues farther to the eastward is the Town of Kotrou, and 9 leagues beyond is that of Lahou.

Lahou is the chief town on this coast, and carries on the chief barter in gold dust and teeth. It stands on the west side of the river, and affords safe riding, varying in depth from 8 to 10, 12, and 14 fathoms; the bottom on the east side of the cape being composed of clay, while that on the west side is mud, with the depths of water somewhat similar. Jack Lahou is nearly 5 leagues to the E.S.E. $\frac{1}{4}$ E. from Cape Lahou, and $6\frac{1}{2}$ leagues farther is that of Picaniny, or Little Bassam, situated to the northward of a tract of sea, which from its unfathomable depth, is termed the Bottomless Pit.

Grand Bassam is distant $8\frac{1}{2}$ leagues from the former, and stands on the eastern bank of the River Costa, which may be known by a cliff or rock on its western point. There is good anchorage here 2 miles off, in 12 to 9 fathoms, mud and clay bottom. Plenty of water and refreshments may be obtained here. The coast between Grand Bassam and the mouth of the Assinee River trends E.S.E. $6\frac{1}{2}$ leagues. This was a place in former years of some trade, but the town is now abandoned. There is anchorage about a mile and a half from shore, in 10 to 12 fathoms, sand and clay.

Three leagues to the eastward of Assinee lies the small Town of Albanee, between which there is anchorage in 13 or 14 fathoms, good ground. Tabo is situated 2 leagues farther, in the same direction, on the west side of 'Gold River; but this part of the coast must be approached with great caution, as it is shoal at the distance of 2 leagues, and has a heavy surf setting on shore. From Tabo to the pitch of Cape Apollonia the coast trends S.E. 4 leagues; the ground around the cape is in general foul, but there is good anchorage with the fort, which stands on the beach, bearing N, $\frac{1}{4}$ W., and the cape N.N.W. $\frac{1}{2}$ W. The landing is very bad, and it is dangerous to cross otherwise than in the canoes of the natives. The gold dust of this place has been noted for its superior quality and quantity, and it, with ivory, may be purchased in barter, as at Cape Lahou. The distance from hence to Axim is 6 leagues, where there is a Dutch factory, named Fort St. Antony,* 2 miles to

* In entering Axim Bay caution will be required to avoid a dangerous rock discovered by Mr W. Van Der Hoeven in March, 1850, who reports as follows:—

"When anchoring in Axim Bay, I brought Fort St. Antony to bear as much East as possible, and found good ground in $5\frac{1}{2}$ fathoms. On the morning of the 1st of March, I started from Apollonia, a deserted English settlement, $5\frac{1}{2}$ German miles above, or to the westward of Axim, and anchored in the roadstead of the latter place in $5\frac{1}{2}$ fathoms. However, the brig by veering out the chain, tailed on a hard ground astern, which made it necessary for me to get under sail again, in order to shift my berth which I did in 7 fathoms, the fort E. by N., although scarcely drawing 9 feet. I immediately

the westward of which is the Seenna, Colra, or Snake River. The entrance of this river is small and rocky, and may be known by three black rocks, with breakers over them, lying half a mile from shore, to the eastward of the entrance. The ruins of another Dutch fort, named Brandenburg Castle, lie 4 leagues south-eastward of Axim.

The coast from St. Andrew's Bay to Cape Apollonia appears extremely low, but it then assumes an undulating appearance, and is thickly wooded. Between Tabo and the cape are four remarkable eminences, standing along the shore, at equal distances from each other, and serve as a good mark for Cape Apollonia.

CAPE THREE POINTS is the centre one of three headlands, which project into the sea, and range in an east and west direction upwards of 3 leagues. The coast hereabout is high even land, but the shore is rocky, and should not be approached nearer than $2\frac{1}{2}$ or 3 leagues, by which precaution you will avoid the current that sets strongly on the reefs. There is anchorage in 12 or 13 fathoms, about 1 league from Acquidah, a Dutch fort, standing on the easternmost projection of Cape Three Points. A bank of 9 and 10 fathoms lies about 5 leagues south of Acquidah, between which and the shore there is a strong current that sets to the eastward.

DIXCOVE is distant 4 leagues to the eastward of Acquidah, and affords abundant supplies of wood and water; gold is also here abundant. The fort is English, being of a quadrangular form, on a rising point; the anchorage is in 15 fathoms, clear oozy ground, with the easternmost point of Cape Three Points bearing W. $\frac{1}{2}$ N., and the fort North, or N. by W., or even N.N.W. At Dixcove there is a small harbour formed by a reef of rocks, which affords a fine landing-place. The Dutch Fort of Bautrey is 3 miles to the north-eastward of Dixcove; then follows Tacorady, another belonging to the same nation; and half a mile to the westward of Secondee is Fort Orange. Secondee is an inconsiderable place, which may be known by the British factory or fort, built on a reddish point of land, with a low sandy beach on each side. The coast hereabout is very rocky, and ought not to be approached in less than 16 fathoms during the night time. About a league to the southward of Tacorady is a reef, with breakers, having 4 fathoms near it.

About 2 leagues to the eastward of Secondee is the River St. John, or Boosempira, a short distance west of which is Chama, distinguished by the Dutch Fort of St. Sebastian; and 9 miles farther is Commenda, where two forts stand, one English, and the other Dutch. This place may be known by a small elevation on the left, named Gold Hill. The anchorage is in 9 or 10 fathoms, sandy ground, with the English fort bearing N.W.

ST. GEORGE DEL MINA, or Elmina, is the chief settlement of the Dutch on this coast, and is distant about 8 miles to the eastward of Commenda. The Fort of St. George stands on a hill named Mount St. Jago, behind the fortress or castle on the beach. The anchorage in the roads is in 7 fathoms, sandy bottom, the fortress bearing north, 2 miles distant, with Mount St. Jago

examined the place, and found a pinnacle shaped rock, over which, at low water, there was scarcely 13 feet; and while the bow of a 24 feet boat rested on the shoal, I had at the stern $5\frac{1}{2}$ fathoms. This danger lies with the following bearings taken by compass, which, according to several observations had 21° westerly variation; (a) Fort St. Antony E. $\frac{1}{4}$ S., Island Bobowassie S.E. by E. $\frac{1}{4}$ E., Island Sagaba N.N.E.

"To avoid this rock bring the fort to bear E. by N., or E.N.E. $\frac{1}{4}$ E., when you may anchor in safety in 8 fathoms.

"The current along the whole Gulf of Guinea mostly sets to the eastward; the rise and fall is 4 or 5 feet."

(a) *Capt. Vidal's plan gives 20° , agreeing very closely.*

open a little to the westward. Cape Coast Castle is distant 3 leagues E. by S. of Fort St. George.

CAPE COAST CASTLE.—This is the principal British fort on the Gold coast; and as it lies low, and as some vessels have not readily been able to distinguish it, but have gone to leeward, and with much difficulty and loss of time have been able to get back, the following particulars will serve to obviate such mistakes in future. Cape Coast Castle may therefore be known, first, by Phipps' Tower, now named Fort William, surmounting a small conic hill of that name. This building is circular, having a barrack in the centre like a pent-house; secondly, another circular building, named Smith's Tower, of which the fortified wall only is seen on a hill of red clay; and, thirdly, by McCarthy, or Hospital's Battery, of an equilateral triangle, with a small citadel at the N.E. corner. Cape Coast Castle presents a frontage of 180 yards towards the sea; but, as it has been observed, it lies low, and the distinguishing marks here noticed will be of utility, and serve to prevent its being mistaken for Annamaboe, hereafter described.

On the 1st of October, 1835, a light was exhibited at Fort William, which burns at an elevation of 204 feet above the medium level of the sea, and at a distance from the beach of 760 yards. It is visible to vessels in every direction, whether approaching or sailing parallel to the line of coast. In steering for the anchorage, vessels ought to bring the light to bear N. $\frac{1}{4}$ W., keeping the lead going, and to anchor in 6 or 6 $\frac{1}{2}$ fathoms water, the light being then distant from the vessel about 2 miles.

In ordinary weather the light will be visible at the distance of about 7 leagues, and will be of great service in preventing vessels been carried to leeward of their port, by the strong south-westerly current which runs off the coast, about 10 months in the year.

The anchorage in Cape Coast Castle roads is in 7 or 8 fathoms, stiff mud, the castle flagstaff bearing N.N.W. 1 $\frac{1}{2}$ mile, in a line with the hall of the castle and Smith's Tower; Elmina Castle W. by N., distant 3 leagues, and Annamaboe Point E. by N. 10 miles.

ANNAMABOE.—Having passed the Dutch Fort of Nassau at Mauree, to the eastward of Cape Coast Castle, you will have regular soundings of 8 or 9 fathoms, at a league distant from the shore, until you reach the English Fort of Annamaboe. This is a small quadrangular building, standing low on the beach. Anchor before the town, in 7 $\frac{1}{2}$ fathoms, with Fort Cormantine (next described) bearing E.N.E.; or perhaps a more preferable situation will be, with the flagstaff of the fort brought in one with the second of the Cormantine mountains, a chain of high land, seen to the eastward. Cormantine is a Dutch fort standing on a hill, 5 miles to the eastward of Annamaboe, off which there is anchorage in 7 fathoms, the fort bearing N.W., or thereabout. The Dutch settlement of Apam, which was next eastward, is now abandoned. The British Fort of Tantomquerry is distant 6 leagues from Cormantine, and 2 leagues from Apam. The fort stands a league to the north-eastward of a point of the same name, which is rendered foul by a reef that extends a mile from shore, and consequently must have a berth in approaching the anchorage off the fort, in 9 fathoms.

WINEBAH.—About 2 $\frac{1}{2}$ leagues to the eastward of Tantomquerry is a high conspicuous mountain, named the Devil's Hill, near to which there is good anchorage in 8 to 10 fathoms, the hill bearing N.N.W. Winebah is distant about 1 $\frac{1}{2}$ league from this anchorage, and was distinguished by a fort, which was destroyed and abandoned some years ago. From Winebah there is a communicating path to the commercial town of Kibbs, in the country of the gold mines; and on the east is a small river, the water of which is good, if

filled at a proper distance from the sea. The natives require a small duty for watering. The small Fort of Barracoe, now deserted, stands on the side of a woody hill, about 3 leagues eastward of Winebah, and may be known by a double hill 3 leagues inland, named the Paps.

ACCRA.—This place is distinguished by three forts, named St. James, Creverour, and Christiansburg, belonging respectively to the English, Dutch, and Danish. The little River Sacoom is $6\frac{1}{2}$ leagues to the eastward of Barracoe, having on its eastern side a little round hill, named Cook's Loaf, with some high mountains beyond it, named the Tafou Mountains, from whence to Accra, distant about 2 leagues, the land is even and moderately high. The best anchorage at Accra is in 6 or 7 fathoms, sandy bottom, distant 2 miles from the shore, with the English flagstaff bearing N. by W. $\frac{1}{4}$ W., or having brought the red spots seen on the beach, to bear North, you may anchor in 7 fathoms, but the other is to be preferred. The surf on the beach here beats frequently very high, and occasions much difficulty in landing. Accra is a place of considerable trade in gold and ivory. During the springs the tide rises 8 feet; the currents set in general to the eastward, except about the middle of January, during the Harmattan season.

Vessels bound from Cape Coast Castle to Accra, and leaving the former, during the night, are recommended not to run more than two-thirds their distance, as if they happen to get to leeward, it will be difficult to work back, against a sea and strong current.

The inconsiderable settlement of the Danes at Temma, lies between Accra and that belonging to the English at Prampran; 2 leagues from the latter is the Danish Fort of Ningo, the coast between affording good anchorage in 6 to 9 fathoms, gravel and sand. Ningo Grande is a high sugar loaf hill, the highest of the range named Crabo, which lie about 8 leagues inland.

THE RIVER VOLTA.—The coast to the eastward of Ningo as far as the River Volta, a distance of 7 leagues, is extremely low, being little above the level of the sea, so that vessels coming from the westward, do not discern the river until it bears N.N.W., when the island within the entrance may be distinguished; there are regular soundings along the shore, and when abreast of the river the water changes suddenly to a dark olive colour. The Danish fort of Adda Castle stands on the western bank, 11 miles from the entrance. The Volta takes its name from the rapidity of its stream, and pours such a quantity of water into the sea as to cause the discolouration already stated. There are high breakers at the mouth of the river, which is only a mile wide, having two bluff points, that on the west named Sandy Bluff, that on the east Woody Bluff. In entering the river, run in from the east side within the breakers; there is anchorage in 7 fathoms, with the entrance of the river bearing N.N.W., a soft muddy flat, cast off by the stream, extending 3 leagues into the sea, having 6 to 9 fathoms water.

REMARKS UPON THE APPEARANCE OF THE LAND ON THE GOLD COAST.—From the Dutch fort of Bautrey to Cape St. Paul, the ship standing along within 5 and 6 miles of the shore. By Captain R. Wauchope, R.N., H.M.S. Thalia. Taken from the *Nautical Magazine* for 1835, page 644. "To the eastward of Fort Bautrey, the fort of Seconde is seen. Its appearance from the sea is that of considerable strength; it stands close to the water, built upon a bank of horizontally stratified sand-stone, of a reddish colour, surrounded on all sides, except that of the sea, by thick wood. A sandy narrow beach stretches to the east and west of it. The bare rock again appears at the termination of the beach to the eastward, and is seen in several places within 8 or 10 miles from the fort, in this direction, and then a densely wooded coast.

“The next fort is the Dutch fort of St. Sebastian, at Chama, or Asina. This is a large white fort, surrounded by natives' huts, having a long narrow strip of white sandy beach to the west of it; the beach is broken to the eastward for above three miles, by the wood extending to the water's edge, when again a long narrow beach continues for 8 or 10 miles, and the red cliff is seen bare of vegetation in several places. The land not high, but entirely covered with low wood. The next fort is that of the British fort of Com-menda, or rather the two forts. They may be seen at the same time with Chama. One of the forts, of a dark grey stone, a square building, seemed to be in tolerable repair; the other, about a mile to the eastward, was a complete ruin. A number of native huts were near the forts, and a greater number of canoes were hauled up on the beach.

“From thence to the eastward the two large and magnificent looking forts (Dutch) of St. George del Mina make their appearance, as if newly white-washed, and are of a dazzling white. On approaching them, we observed, about half a mile apart, two other small forts, the one to the westward being round, and the other square. The western large fort is situated upon a rising rocky ground, about 70 feet above the level of the sea. The east large fort stands on the beach, in the middle of a considerable sized village. Some of the houses are of stone, but chiefly miserable looking huts. To the eastward of Del Mina, the same low undulating wooded line of coast stretched along with a narrow strip of sandy beach.

“Soon after Del Mina is clearly made out, the round white-washed tower (Phipp's Tower) of Cape Coast Castle is seen rising magnificently from the sea; it is built upon rising ground, to the rear of the castle, and is the first object which is seen. On approaching, the handsome and extensive castle of Cape Coast is clearly seen; and, on landing, the interior does not disappoint expectation, as the whole of the buildings are in admirable repair. A few miles to the eastward of Cape Coast Castle, the ruined English fort of Morees is seen. The mud huts of the natives still surround the square brown ruin. Still farther to the eastward, the small English white-washed fort of Annamaboe is seen. The appearance of the coast is similar to what we have already passed, viz., a narrow sandy beach, rocky in some places, and low undulating hills, covered with low underwood, behind.

“A few miles to the eastward is the ruined square brown Dutch fort of Cormantine, situated on a pretty rocky green hill, close to the sea. The natives' huts extend to the westward of the fort, and to the eastward the same description of coast as that above-mentioned. At 5 leagues to the eastward of Cormantine, Tantomquerry Point is seen; it is low and rocky. There is a reef of rocks lying about a mile to the N.E., on which the sea was breaking when we passed it. On first seeing the point, one fort only is observed; on approaching, another square brown fort, nearly joining the former is seen, and the low land becomes visible beyond the Devil's Hill, which is the highest hill on the coast between Cape Three Points and Accra. When abreast of Tantomquerry Point, the fort of Apam is seen to the left of Devil's Hill, —a brown ruin of considerable size. A large native village surrounds it, except to seaward. Along this whole line of coast (for we have run it down within from 4 to 6 miles) there are native villages to be seen at intervals, consisting of thatched mud huts.

“The next fort is the English fort of Winebah, now in ruins. When abreast of this, you can just see Tantomquerry Point, and the fort to the westward, and Barracoa Point to the eastward. Winebah stands upon a low line of hills, having nothing particular to mark it, except a white-washed thatched house of considerable size on the beach, and the ruins of a fort.

little to the left. There is high land in the distance. The next point is Barracoa Point, with a very remarkable palm tree upon it; and to the eastward of it, considerably higher than the low land, the peculiarly-shaped double hill, named the Paps, is seen in the distance: this and the palm tree point out its situation very distinctly. On nearing the point, the fort, and flagstaff, and native village are seen, and the distant coast beyond, terminating in a very low point. On rounding Barracoa Point, the Paps are much more distinctly seen, being much nearer; and the remarkable hill, named Cook's Loaf, a conspicuous round hill, is seen close to the sea.

"The land to the west of Cook's Loaf appears very low, and to run out to a very low point, having still the same narrow strip of sandy beach; and on the point the three white forts of Accra are seen, and a fourth, the Danish, three miles to the eastward. The English and Dutch are within a mile of each other, so that the coast about Accra is particularly well marked

"We sailed from this on the 17th November, and on the 18th hauled in for the land, and found ourselves in the morning abreast of Ningo, a Danish fort. It is a good looking white-washed fort, apparently in good repair, about 7 miles off shore. The water shoals to 7 and 8 fathoms; a little farther out, 12, 13, and 14 fathoms; and all the land seen to the eastward appears very low indeed.

"The marks for Ningo are some hillocks to the eastward, and the high conical mountain of Ningo Grande inland; the hillocks I could not make out clearly; when abreast of Ningo a small white fort is seen to the westward, which is, I suppose, the English fort of Prampram. There is the same narrow line of sandy beach, as we have observed all along, to the westward of Prampram still. Another white-washed house, or fort, may be seen when abreast of Ningo. To the eastward, the tops of trees are only to be seen, the land being so low. Six and seven miles from the shore, the soundings along the coast are 11 to 13 and 14 fathoms, coarse sand, and in some places rocky bottom.

"A great quantity of sea-weed was seen to the eastward of Ningo, the first we met with on the coast. A-beam of us, about 1 P.M., some miles to the eastward of Ningo, observed a flagstaff, and two large thatched houses; a number of naked negroes; and on the beach was a good deal of surf. The wood on the coast here consists chiefly of a peculiar kind of palm, the stem similar to the cocoa-nut tree, but the upper part more bushy, and similar in appearance to the silver tree at the cape.

"At 3 P.M., 18th November, saw the mouth of the River Volta, bearing N.N.W. It is on this bearing alone upon which it can be seen. The two bluff heads at the entrance appear very bold, and make the mouth of the river very obvious. In standing along to the eastward, the entrance was not seen above five minutes, as it was soon shut in by the eastern bluff.

"The whole coast to the eastward of the Volta to Cape St. Paul, is very low; nothing but trees are seen. In $9\frac{1}{2}$ fathoms off the cape, this is its appearance; nor could the cape itself be made out, except from the trending away of the land to the northward."

BIGHT OF BENIN.

CAPE ST. PAUL is 5 leagues distant from the Rio Volta. Hereabout the land is low, and cannot be seen at more than 3 or 4 leagues off; the point is thickly wooded, the current setting strongly round it. About a league to the westward of it is the entrance to the River Secos, or Dry River. Cape St. Paul, as well as the whole coast of the Bight of Benin, to Cape Formosa,

its eastern extremity, is extremely low, so that one point is with much difficulty distinguished from another. About $4\frac{1}{2}$ leagues N.E. of Cape St. Paul is the Danish fort of Quitta. From thence to Acquijah is 3 leagues; and from the latter to Paurey, the distance is about the same. Gugligou lies 4 leagues to the eastward, and may be recognised by four hills lying a league to the eastward.

LITTLE POPOE is about 4 leagues from these elevated spots, which are the only eminences hereabout. The town stands on a small river of the same name, southward of which there is anchorage in 9 or 10 fathoms, coarse white sand. In the bight from Quitta to Little Popoe, 8 to 14 fathoms will be found 4 leagues from shore. GREAT POPOE is distant $7\frac{1}{2}$ leagues to the eastward, and at $4\frac{1}{2}$ leagues E. by S, from Great Popoe, is Whydah. The coast between is low and swampy, and in some parts wooded. At Whydah are three factories, formerly in possession of the English, Portuguese, and Dutch. At 8 miles to the westward of Whydah is a conspicuous elevation named Mount Palaver, and at 3 miles to the westward of it, close to the sea-side, are two palm-trees, named the Brothers: these objects will serve to point out the position of the town, off which there is anchorage in 8 fathoms, muddy bottom, the Two Brothers bearing N.N.E., and the town of Whydah N. by E. Griwhee stands, within Whydah, on a lagoon or lake, which runs parallel with the beach, and communicates with the sea at Popoe. The coast being low, and no object to intercept the view, in sailing to the eastward from Popoe, Griwhee may be seen with a telescope, when you are in 8 fathoms, distant a league from the shore.

The next town to the eastward of Whydah is Jackin; after that follows Appee, where formerly an English factory was established; the next is Porto Novo, distant 3 leagues from Appee, and 10 leagues to the eastward of Whydah. Vessels anchor before the town of Porto Novo, in 7 or 8 fathoms, black clay, with shells. Porto Novo is the port of Ardrah, the capital, which is distant 8 leagues to the northward. The roadstead of Badagry is in 6 or 7 fathoms, and is tolerably good; it lies 4 leagues from Porto Novo, and the town of this name is situated a league from the beach, on the north bank of the lake or river that runs from Ardrah into Lagos River, which is here 600 feet wide.

RIVER LAGOS.—From Badagry to the entrance of the River Lagos, the coast is very low and marshy. It is bordered all along with palm-trees, and the landing is rendered dangerous by the high surf: besides, it is much subject to heavy rains and tornadoes, which may be foreseen by the great thunder and lightning, with the rising of black clouds, which commonly precede them; then it is best to hand all your sails, except your foresail, which you may keep in the brails, to command your ship, and run before the wind during the tornado, for what you get is to windward.

The entrance to the River Lagos, though half a mile broad is reduced to little more than half that breadth, by the banks that project on each side. On the west is a small river, where wood and water are obtainable. Lagos Island, within the entrance, is 5 miles long and $1\frac{1}{2}$ in its greatest breadth; at its north end is the town of Lagos, having good anchorage before it. About 4 miles to the eastward of the entrance, or the English Road, lies the French Road and the watering-place. Cradoo Lake extends 15 leagues from west to east, its greatest breadth not being above 2 leagues; the town of Cradoo stands on the north shore, about 12 leagues from the entrance. Between Badagry and Lagos River numerous huts are scattered along the beach, in the midst of pretty groves of cocoa-nut trees. The mouth of the River Lagos is so contracted that it may easily be passed unobserved, and

probably would be were it not for the breakers at the entrance. Ten leagues to the eastward of Lagos is the small town of Palma, and 9 leagues farther, in the same direction, is Oddy: the coast from hence, for 8 leagues, trends to the eastward, where it takes a S. by E. $\frac{1}{4}$ E. direction (S.E. $\frac{1}{4}$ S.) 3 leagues, to a small fishing-town interspersed with several lofty trees; from this small town the coast trends, in the same direction, 7 leagues to the River Benin, or Great Formosa River.

The following perhaps may not be considered as misplaced:—Dalzel says, “From Sherbro to Rio Formosa, or River Benin, (which is the part of Africa with which Europeans are best acquainted,) a tract of 1400 miles of sea-coast, there is not one navigable river, bay, or harbour, into which a ship can enter; nor is there one river or creek, (the Volta and Lagos excepted,) into which a sailing-boat can advance 10 miles from the sea; very few of the creeks will even admit a boat, and not one on the Gold Coast, except at Chama and Elmina: a small boat may row up the former about 2 miles, and up the latter about a quarter of a mile.

The shores are, almost in every part, difficult of access, from the heavy surf which breaks upon the beach; it is scarcely possible to land anywhere but in a light canoe, and even in that way it is frequently impracticable for many days together; in many parts, besides, there is, near the shore, scarcely water enough for a canoe, and the breaking of the waves becomes there so impetuous, that all communication between the shore and the shipping is frequently interrupted for three weeks together, and can seldom be effected with safety.”

RIVER BENIN, OR GREAT FORMOSA RIVER.—The coast in the vicinity of the entrance of this river appears like a green low bushy strand, in front of a thick row of trees, of regular and moderate height; in the vicinity of the river the usual depths vary from $4\frac{1}{2}$ to 5 fathoms, at 2 leagues from shore, but off the mouth it is not quite so deep. The course from Lagos to Benin River is S.E. (S.E. by E. $\frac{1}{4}$ E.) 32 leagues; but it is advisable for strangers to keep in the parallel of 6° N., and having made the land near the small fishing-town already noticed, coast along shore to the entrance; the water before which is generally of a dark green colour, and more shallow than on any other part of the coast.

The River Benin is about 2 miles wide at the entrance, having a bar of mud, clay, and sand, that extends a league into the sea, on which are only 2 fathoms at spring tides, and it is therefore not fit for vessels drawing more than 9 or 10 feet. At a few miles from the sea this river is only half a mile wide; and at New Town, which is 6 leagues up, little more than 400 or 500 yards. Two branches near New Town, named Gato Creek and Warree Creek, are nearly equal in magnitude to the main trunk; one, running to the N.E., communicates with Gato, and the other with the River Warree, or Forçados. The direction of the main trunk is about E.N.E.; and, according to the report of the natives, at about 50 miles up, it is not navigable for vessels of 50 tons. The depth of water in any part does not exceed 4 fathoms.

The kingdom of Warree is situated to the south of Benin River. Its first town lies near the bar, and is named Salt Town; the second is named Bobee, or Lobou; and the third, which is the seaport of the capital, is named New Town; the last is opposite Reggio Town and Point, on the east side of the entrance of Gato Creek. Both shores of the main branch, as well as the creeks, as far as Gato on one side, and Warree on the other (with the exception of a few spots) consist of impenetrable morasses covered with mangrove-trees, and generally inundated, even during the dry season, as the banks are *very low*. Formerly several European nations, as the Portuguese, Dutch,

English, and French had establishments on this river, chiefly at Gato; but trade has so much decreased, that they have been all abandoned, and merchant vessels, now trading here, merely hire a house for bartering in as long as may be necessary. The slave-trade, which is carried on to a great extent in all the rivers of this coast, appears to be the cause of the decline of legitimate commerce. This river, like all the others on the coast, is pestilentially unhealthy, and the mortality that invariably occurs in the crews of vessels trading here, is appalling; the disease is a malignant remitting fever, which generally proves fatal within the third day after the attack. The chief articles procured in this river are palm-oil and ivory; pod-pepper (cayenne) was also an object of commerce, but is now more plentifully procured from the West Indies. In exchange the natives take cloth (scarlet particularly), beads, guns, and gunpowder, hardware, spirits, &c. The best season for traders to the Benin River is between the month of September and the latter end of February, during which period there are clear refreshing breezes, with fine weather, and land-winds favourable for going out; but, beyond the month of February, as the weather changes, getting out is attended with difficulty and danger. Here the tide flows 6 hours, at full and change, and rises 5 or 6 feet during the rainy season; the ebb is very rapid, and frequently washes away portions of the river banks.

The best anchorage without the bar is in $4\frac{1}{2}$ fathoms, heavy mud and clay, distant 4 or 5 miles, with the river well open, and the N.W. head bearing N.E. In entering, stand toward Salt Town within a league, until the N.W. head bears N.E. by N. (nearly N. by E.); then steer N.E. by E., about 2 leagues, toward the port shore, as you thus avoid the Lobou Bank, which lies on the opposite side, and which reaches more than half-way over. Having advanced, Jo Point, which is covered with trees, will be seen on the starboard side. By steering for the middle of the river, off this point, you may there drop anchor in 4 fathoms, having a creek with an islet at the mouth to the northward. This creek is named Waccow Creek, and comes down from Waccow's Town, which is 5 miles up, from Benin River. The anchorage here is best for vessels intending to stay any time in the river, being open to the sea-breezes, with a free draught through the roads, and in a central situation for trading purposes. Within Jo Point is Calabar Creek; at 5 miles higher, on the opposite side, is another inlet, named Lago Creek, having an islet on each side of its entrance, surrounded by a mud-bank: the latter will be avoided by keeping over to the starboard shore until you are off the large opening named Gato Creek, where you may anchor abreast the Town of Reggio on the North, and New Town on the South, in $3\frac{1}{2}$ and 4 fathoms.

The RIVER ESCRAVOS is distant 14 miles, S. by E. $\frac{1}{4}$ E. (S.E. by S.) from that of Benin, and has not more than 2 fathoms at the entrance; a bank also extends some considerable distance from its south point. The land from hence winds to the eastward, 5 leagues to the River dos Forcados, or Warree. The entrance to this river may be known by an island in the centre, and another named Paloma, near the shore on the south side; the entrance is shoal, having but 2 fathoms water, and a flat extends from the S.E. side, but without the river there is anchorage in 7 fathoms, muddy ground. A league within the river is the Town of Paloma; the City of Warree is distant from this town 5 leagues, in a N.E. direction. The River Ramos is not a stream of much importance: its entrance is distant 17 miles, S. $\frac{1}{4}$ W. (S. by E. $\frac{1}{4}$ E.), from the River Forcados, and is scarcely a quarter of a mile broad. The River Dodo, another inconsiderable stream, is 20 miles S. $\frac{1}{4}$ W. (S. by E. $\frac{1}{4}$ E.) from the River Ramos; and about 7 leagues S. by E. $\frac{1}{4}$ E. (S.E. $\frac{1}{4}$ S.) from the latter is Cape Formosa.

CAPE FORMOSA, and the land around it, is so low, that it is not easily recognised, and soundings of 14 or 15 fathoms may be obtained ere you are aware that land is near. Within this depth, the first objects to be distinguished are the trees, which at first seem to grow in the water, and intimate your approach to shore, at between 2 or 3 leagues from which you will have 8 fathoms water ; but we would recommend vessels not to get nearer, as at this distance they are without the influence of the current, which in July and August sets strong to the eastward. All the coast from the Benin River to Cape Formosa, a distance of nearly 40 leagues, is low, swampy, and unhealthy, and is thinly inhabited, and but little frequented.

BIGHT OF BIAFRA.

The Bight of Biafra is the innermost part of the Gulf of Guinea : it is bounded on the north by Cape Formosa, and on the south by Cape Lopez. Cape Formosa divides it from the Bight of Benin. A straight line, uniting both promontories, and passing near Princes' Island, would measure about 580 miles, and would be upwards of 250 miles from the mouth of the Old Calabar River, which enters the innermost corner of the bight. The shores of the bay probably extend to more than 800 miles.

The current prevailing in this bay does not appear to be in any way connected with the equatorial current of the Atlantic Ocean, which commences near the Island of Anno Bom, but to be a continuation of that current which comes up from the Cape of Good Hope, along the western shores of Africa, for Captain Boteler says, that all the currents along Prince's Island set strong, and in the dry season commonly between N.N.W. and N.N.E. The wind generally blows from the S.W. or South. The current, however, is changed by the tornadoes, whenever they occur at full or change ; at which time, blowing from the S.E. or N.E. with great violence, they alter the direction of the current to W.S.W. or W.N.W.

THE QUORRA RIVER, or NIGER, whose principal branch, the Nun, empties itself into the sea near Cape Formosa, is the first of six rivers which intersect the coast between the land of Formosa and the New Calabar River. The Nun is the only one of the number that is accessible, and this is rendered difficult by a shoal and small rock, half a league from the mouth, on which the sea breaks ; the water is muddy off the entrance, as far as 7 fathoms water. The second is that of St. John, or Bento, and is distant about 11 miles from the former. The third is named St. Nicholas, and opens when it bears N.N.W. : it is 11 miles from the River Bento. The fourth, or St. Barbara, is 11 miles E. $\frac{1}{2}$ S. (E.N.E. $\frac{3}{4}$ E.) from that of St. Nicholas ; the entrance is wide, but does not open until it bears N.N.E. The fifth, or St. Bartholomew, is $7\frac{1}{2}$ miles to the eastward, and has shoal ground extending from the entrance to the distance of 4 miles, without which are 3 or 4 fathoms. The River Sombreiro, or sixth river, lies $10\frac{1}{2}$ miles to the eastward, and is the last of the six which lie between New Calabar and Cape Formosa : it opens when bearing N. by W., and makes with a large tapering bluff on the west side. The coast between Cape Formosa and the Calabar is thickly covered with mangrove ; it has a sandy beach, without which are 6 and 7 fathoms, bottom of stiff mud and clay ; a strong current generally sets to the eastward.

Vessels bound to New Calabar, or Bonny Rivers, are advised to make the sixth, or Sombreiro River, which opens when it bears N. by W., in order to ascertain their situation. Between it and the western extremity of New Calabar, named Foché Point, there is a bank of hard sand extending from the

shore nearly two leagues, as far to the eastward as Foché Point, where it is bordered by a line of breakers: the sea occasionally breaks on the western extremity, but it may be passed in 5 or 6 fathoms. From off the River Nun, or Quorra, the course to Foché Point is E.S.E. $\frac{1}{4}$ E., 20 leagues, running along in about 8 fathoms, muddy bottom, distant between 3 or 4 leagues from land. It is better not to run further on this coast than the sight of land ahead in the evening, but come to anchor, lest you be set to leeward. After leaving Sombreiro River, the shoal, already noticed, will oblige you to haul off a point or two, but with daylight, Foché Point will be seen before you get that length.

NEW CALABAR AND BONNY RIVERS.*—Rough Corner is the eastern extremity of New Calabar and Bonny Rivers. There is a channel on each side into the respective rivers, but the middle part is occupied by a large bank extending out to sea, and on several parts of which are only 3 feet of water, with one or two islets, and several spots nearly dry at low water. From Foché Point to the eastern point of the entrance of the New Calabar the river is two miles wide; but lower down, between Foché Point and the middle bank, or Calabar Flat, is little more than a mile. The bar is formed by a spit of sand, extending to the S.E. from Foché Point: its inner part dries, but without this are 10 to 15 feet water. There are several shoals in the channel without the bar, on the west side; the mark for which is Foché Point bearing N.E. $\frac{1}{4}$ N., and with these bearings the channel may be entered, by giving the shoals a proper berth.

BONNY RIVER.—The following directions for the Bonny River were written some years since, and must therefore be very cautiously followed.

The best anchorage off Bonny River is with Foché Point bearing N. $\frac{1}{4}$ W. about 8 miles, and Rough Corner N.E. $\frac{1}{4}$ E. the same distance; or Jew-jew Point, a low point a mile within the latter, a little open to the left of it. The anchorage here is strong holding-ground, and you will be near the fairway of the entrance without the banks in $4\frac{1}{2}$ fathoms, within a mile from the bar; the latter extends S. by E. from the great middle ground or flats, its outer extremity bearing S.W. $7\frac{1}{2}$ miles from Rough Corner. The Baleur Bank lies to the eastward of the bar, and extends 4 miles S.E. and N.W.; the channel between it and the bar is a mile in breadth; the Middle and Eastern Patches lie to the eastward; and between these and the Bonny Flats, which extend from shore, and are steep-to, lies the Eastern or Portugese Channel into the river. The Portuguese Bank lies to the eastward of the patches. The town of Bonny stands on the western side of a creek, 3 miles from Jew-jew Point. On the opposite side is the point and town of Peter Fortis, below which is a bank dry at low water.

You will enter the river over the tail of the bar, by bringing Peter Fortis Point well open of Jew-jew Point. This will enable you to clear the west end of Baleur Bank in $3\frac{1}{2}$ fathoms; but take care that the flood through the Portuguese Channel will not drive you towards the Calabar Flats, which are steep-to. Having passed the Baleur Bank, steer N.E. $\frac{1}{4}$ N., keeping Rough Corner open on the starboard bow; the water then increases from 7 to 12 and 16 fathoms, as you approach the Bonny Flats, the spit of which is half a league, W.S.W., from Rough Corner; as you advance to Jew-jew Point, the soundings gradually decrease from 15 to 10 and 9 fathoms. Keeping the starboard shore on board, you will then reach Bonny, and anchor opposite a sandy point, with houses on it, at the entrance of the creek leading to the town, distant 4 miles from Rough Corner. During the day-time, a vessel may enter

* It is recommended never to attempt these rivers without a pilot.

Bonny at any time of the tide, with wind and clear weather; keep a steady look-out, and the western breakers will direct you.

Although the mouth of the Bonny is surrounded by shoals, and there are two dangerous bars to pass, yet, when once in the river, nothing can be finer; the water deepens to about 10 fathoms, and, for the first 7 or 8 miles, the breadth is about 4, when it receives a large tributary stream, which vessels, not drawing more than 13 or 14 feet, can ascend for some miles. Vessels trading for palm-oil lie two miles below this stream. The river ought never to be attempted without good pilots.

Captain Midgley says:—"The estuary of the New Calabar and Bonny Rivers is 7 or 8 miles wide, between Foché Point and Rough Corner. Having made the Rio Sombreiro, or sixth river, which is open when bearing N. by W., Foché Point will be seen farther to the eastward, and will appear from the deck to be the extremity of the land in sight. Foché Point will appear rather bluff; and, on advancing to the eastward, when the point bears N.E., two ragged trees upon it have a great resemblance to a topsail schooner at anchor behind the point.

If bound to New Calabar, anchor in $5\frac{1}{2}$ fathoms water, with Foché Point bearing N.E., and send a boat for a pilot. The pilots' town is at Foché, upon the banks of a creek, in within a cable's length up the river from the point. Whoever has charge of a boat going into this river, should be extremely cautious, as, owing to the breakers, the point cannot be approached within more than half a league, until the boat has rounded the point-breakers, and entered the river so far, that the coast to the westward will be shut up behind the point. Hence, upward, they may run the boat upon the bold sandy beach in safety, as there is not the least fear of being molested by the natives; however, if they can find an opportunity, when unseen, they will pilfer every article that is not too hot or too heavy to carry away.

Between the Rio Sombreiro and Foché Point there is a kind of gap or indent in the land, which is very remarkable, as the land elsewhere in the neighbourhood is uniformly level or nearly so.

If bound to Bonny, when Foché Point bears N.E., haul rather more to the S.E. into 6 fathoms of water (to avoid the west end of the Breaker Island flats), and be careful, by hauling to the southward, not to get into less water, especially upon a flood-tide. As the vessel advances to the eastward, she will gradually raise Rough Corner (a low and level elbow land) upon the port bow; and at this time, Breaker Island, which is very low and sandy, with one small solitary patch of brush upon it, and lies at the mouth of the two rivers, will be seen from the mast-head, like a dry sand-bank. Keep the vessel in 6 fathoms water, and anchor when Foché Point bears North. This anchorage is about one mile farther out than the position generally adopted, but it has not only the advantage of clearer ground, and consequently better anchorage, but it gives more time upon a flood-tide to get sail upon the vessel.

Bonny bar has long been notorious for the great number of anchors lost upon it, and in its vicinity; the cause of which is the heavy short sea that invariably gets up after a change of wind, or a moderately heavy squall. All vessels trading to the oil-rivers of Africa should have the windlass and bits well secured, and good anchors and cables, as they sometimes ride exceedingly heavy, and in very exposed anchorages. A boat may be sent into Jew-jew Town, at the entrance of Bonny River, for a pilot, if one be required.

Seasons.—The seasons here appear to have been imperfectly described. *The rains generally commence in the latter end of May or early in June, and gradually increase, with strong S.S.W. and S.W. breezes, during the months*

of July, August, and great part of September, toward the end of which month they as gradually terminate. In July and August, heavy squalls frequently prevail; and in these months the wind very rarely shifts more than between S.S.W. and S.W., and the rain is incessant from sunset to nearly noon next day, when it ceases for a few hours, and again commences with more or less violence in the evening. In October the weather becomes more settled, with light land-winds, and occasionally showers of rain, which, however, yield to the moderate sea-breeze that sets in about 10 or 11 a.m. In November the tornadoes commence, and are at first violent, gradually decreasing in strength, as the Harmattan or dry season commences, although they are occasionally prevalent from this month to May. In December, January, and February, is the Harmattan season; and in these months the sea-breeze sets in about noon, and blows with very moderate force from the W.S.W. and westward until sunset, when it dies away to a calm. During the night there is little or no wind, and the weather is extremely sultry and oppressive, with very heavy unwholesome dews.

After daylight a light air springs up from the northward or N.N.E., which gradually increases to a moderate force, and continues until about 11 a.m., when it falls calm, and soon after is succeeded by the light westerly breeze. The Harmattan, however, sometimes blows steadily and without intermission, from the N.E. quarter, for several days together, especially about the new and full moon. It is at this season that the smokes prevail, and are extremely injurious to the European constitution. These smokes are so dense, that it is impossible to see a cable's length from the ship for days together; and any vessels that may be in the offing, inward bound, have no resource but to anchor, and wait with patience for clearer weather. In March, April, and May, the weather is clear, with light land-winds at day-break, which gradually die away, and are succeeded by the W.S.W. breeze, about 10 a.m., and this breeze blows with moderate force during the remainder of the day, and greater part of the night. In these months the atmosphere is serene and clear, particularly during the nights, which are very fine indeed. The palm-oil season commences in the early part of March; the oil becomes plentiful in April, and continues to be so until September, when it declines; and from October to March it is, properly speaking, out of season, although small quantities of it may be procured in these months."

OLD CALABAR RIVER.—The coast to the eastward of Bonny River to the Calabar is low, and covered with trees; it is bordered with sand, and has not any particular mark to distinguish it. At five leagues, E. by S. (E. $\frac{1}{4}$ N.), from Bonny River is Andoney River, which is rendered unnavigable by a hard sand-bank, with breakers at the entrance. At twenty leagues, E. $\frac{1}{4}$ S. (E. by N.), from Andoney River is the western extremity of the entrance of Old Calabar River, named Tom Shot's Point; from which to Backasey or East Head, opposite, the breadth is 10 miles. A shoal extends to Tom Shot's Point to the S.S.W., 10 miles, and is nearly dry at low water in several places, with heavy breakers, which may be heard and seen at a considerable distance; there are also several shoals near the middle of the entrance, and a broad shelf encircles the Backasey Land more than 4 leagues to the southward, and encumbers the eastern side of the river for nearly 6 leagues within the entrance. The East Head is high and steep, with a break in it, named Backasey Gap.

From off Bonny River the course to the entrance of Old Calabar River is E. $\frac{1}{4}$ S., in 10 fathoms, soft oozy ground. As you draw towards the river, the depths decrease to 7, 6, and 5 fathoms, hard ground; the East Head then becomes visible, bearing E.N.E.; and having stood on to the eastward, until

it bears N.N.E., the ground will be found soft ; then haul in North, bordering on the hard ground, when you will soon descry Parrot Island. Having discerned Parrot Island, you should keep away in 4 fathoms, soft ground, towards the mouth of Qua River, on the starboard side, when you will deepen your water to 5 and 6 fathoms. Tobacco Head is a head of land to the northward of Parrot Island, which, by keeping open, you will run in about $2\frac{1}{2}$ or 3 fathoms, within two miles of the island. Having steered about half-way up Parrot Island, you should stand towards James Island, which you will perceive on the starboard side ; and as you proceed for the latter, you will have $2\frac{1}{2}$ or 3 fathoms, gradually increasing to 4 or 5 as you go on. Keep the points of James and Parrot Islands open about a sail's breadth, until you arrive at Seven Fathoms Point, and then stand to the eastward, until the shipping before the town come in sight. From Seven Fathoms Point keep across the river to the lower part of the tall trees, and stand close to them till you are abreast of Henshaw's Town, when you may cross to the place of anchorage. The town of Henshaw stands below Duke's Town, the latter being the place of trade, and off which vessels are moored ; it is distant about 24 leagues from the sea, on the S.E. bank of the river.

At the entrance of the river it is high water, on full and change, at 6h., and the vertical rise is 6 feet. The breakers here, on the western side, are heard and seen at a considerable distance ; the rocks are large, and some above water : they must have a good berth. If you arrive here late in the evening, or with ebb-tide, come to an anchor ; but with favourable time and tide you may enter, by attending to the preceding directions. As the Backasey shore is mud, and the breakers' side sand, on shoaling your water with soft bottom you edge over to the westward, and with sandy bottom, on the contrary, to the eastward ; and thus, by the lead, you may venture as high as Qua River, in thick weather. From this place you enter between the banks of the Fish-Town shore on the starboard, and Parrot Island Bank on the port side. The latter now forms a hook to the northward, between which and Parrot Island many vessels, beating down, have been entrapped ; and this must, of course, be cautiously avoided. It may be farther necessary to observe, that the ebb-tide sets with great rapidity, from the Backasey River over the western breakers, and for which vessels bound outward should make proper allowance. When you are out, stand to the S.E., particularly with a light wind, to prevent the possibility of drifting on the breakers on the western side.

SEASONS.—The spring commences about November, and the hot months of summer continue until May, during which period the weather is clear and fine, but excessively hot, with occasional tornadoes. From the middle of June, the rains gradually increase, and continue in all July and August, descending, during the latter, in torrents. This period may be considered as the winter, and, during it, the inhabitants are afflicted with colds, fluxes, fever, &c. In September, October, and November, the country is entirely enveloped in exhalations, which the natives term the smokes, and which are exceedingly injurious to the European constitution. In this season, fumigations of tobacco through the vessel, with smoking, have been found efficacious in repelling the pernicious effects of the vapour. It is advisable, for those who intend to remain for a season in the river, to have a housing over the vessel, in order to preserve the health of the crew, as well as the ship's decks and sides, which will otherwise be materially damaged, by exposure to the sun, during so long a period.

CURRENT.—Captain Midgley says that “the mariner should be on his guard against the effect of the strong easterly current that runs from Terra

Formosa to Old Calabar. This current runs with greater or less velocity almost throughout the year, except in or about the Harmattan season, when it occasionally sets to the Westward and W.S.W. Vessels that have advanced much to the eastward of Terra Formosa, and cannot see Foché Point before night, should anchor, in order to prevent the effect of the current; but in squally weather, or the wet season, it may be as well to work to windward, heaving-to occasionally during the night, according to circumstances. Nine or ten fathoms is quite close enough to stand in shore in the night; when in 6 fathoms, the surf can be very distinctly heard. When once to leeward on this coast, getting up to windward again is attended with much trouble and difficulty.

I may here remark that too much attention cannot be paid to the lead, upon any part of the coast of Africa, as the current frequently sets directly in upon the land; and from careful observation, upon the windward coast, I can confidently assert, that the thermometer is no guide whatever on approaching the land. In more than one hundred experiments upon the surface water, I could never detect any sensible difference in the temperature when sailing toward the land from no bottom into 45 and 40, and thence close in shore into 14 or 15 fathoms on the Krou coast. In the dry season there is little difference hereabout in the temperature of the air and water; the former averaging 77° to 81° (in the shade) and the latter 74° or 75° of Fahrenheit.

The *Homeward Passage*, through the Bight of Biafra, presents no particular feature to the attention of the navigator, if I may except the strong N.E. currents that almost invariably prevail in it. All homeward bound vessels, that do not intend calling at Fernando Po, should use every possible exertion to pass to the westward of the island, as a good board may be then made to the southward on the starboard tack. Except in the Harmattan or Tornado seasons, no advantage can be derived from standing close in shore, as there are no land winds, and a near approach is, at any time, very dangerous, as the whole of the coast from Camaroens to the Gaboon (except about Corisco) is generally bold-to, and the soundings in no wise to be depended on. Many navigators have remarked, that on standing to the westward between Princes' and St. Thomas's, even when making a trifle of northing, the N.E. current has been found to diminish in strength as the vessel makes westing. Even so far to the southward as 3° South there is seldom any easting in the wind before passing the meridian of Greenwich.

Vessels bound to the northward should not attempt crossing the equator to the eastward of 20° W. (the meridian of $21\frac{1}{4}^{\circ}$ W. is to be preferred), and should then make a North or N. by W. course to get into the N.E. trade-wind, which, having once fairly gained, the homeward navigation is generally well understood. In this route, after leaving the Guinea Current in the Bight of Biafra, the ship will gradually get into the Equatorial Current as she gets to the southward; and this current frequently runs with considerable velocity. On examining my journals, I find that, by good lunar observations and an excellent chronometer, I have at various times made the following differences to the westward of dead reckoning, in the run from Saint Thomas's to longitude 20° West of Greenwich, between the parallels of $0^{\circ} 35'$ N. and 3° S. latitude. In 1830, the brig Ann was set 237 miles to the westward, and 78 miles to the northward of account, in 20 days. In October and November, 1831, the barque Severn was set 240 miles to the westward, and 94 miles to the northward of account, in 23 days. In October, 1833, the Freeland was set 246 miles to the westward, and 51 to the northward of account, in 20 days. In August, 1835, the same vessel was set 228 miles to

the westward, and 43 to the northward, in 19 days. And, in November and December, 1836, the brig *Caledonia* was set 370 miles to the westward, and 107 miles to the northward, in 18 days. But it may be observed that, in the latter vessel, I never crossed the equator, but was generally 8 or 10 miles to the northward of it until I crossed the meridian of 12° W. In the above runs I have occasionally, but rarely, found slight differences to the southward. When to the southward of the equator, abreast of the Bight of Benin, I have always found a current running at least three-quarters of a mile an hour to the northward."

The Backasey Land divides the RIO DEL REY, OR KING'S RIVER, from that of Calabar, the western point of entrance of the Rio del Rey being about $2\frac{1}{2}$ leagues from Backasey Gap, and is bluff and rocky, having a reef stretching two miles to the eastward. This river is but little frequented in the channel; the depth of water is not more than 2, $2\frac{1}{2}$, or 3 fathoms, muddy bottom. The Mountains of Camaroens lie to the eastward of the Rio del Rey, and has a remarkable high peak 12,357 feet above the sea, which may be seen at a considerable distance. The Rumby Mountains lie to the northward of the Camaroens, and extend 9 leagues from North and South; and an insulated mountain, named Qua Mountain, stands 7 leagues, N.W., of the Rumby Mountains. With the peak of Camaroens S.E. $\frac{1}{4}$ E. (E S.E. $\frac{1}{4}$ E.), the highest peak of Rumby Mountains E.N.E. (N.E. $\frac{1}{4}$ E.), and Qua Mountain N.E. by N. (N. by E. $\frac{1}{4}$ E.), you will be without the bar of the Rio del Rey River, at $2\frac{1}{2}$ leagues S.S.W. of Backasey Point, which is the western extremity of the entrance.

RIVER BIMBIA.—From the Rio del Rey to the River Bimbia, a distance of 16 leagues to the south-eastward, the land is thickly wooded. An insulated sunken rock lies $2\frac{1}{2}$ miles to the southward of the entrance, between which and the coast are 3 to 4 fathoms water. Vessels should cautiously avoid this danger, if bound to the River Camaroens, the entrance to which lies 4 leagues more to the eastward; the intermediate soundings increasing from 3 to 6 fathoms, as you approach the mouth of the river. The River Bimbia may be known by an islet, on its western side without the entrance, which extends a mile north and south, distant about half a mile from shore; there is anchorage, in 16 feet water, on its N.W. side. The watering place is on the west side of a small cove, about a mile to the north-eastward of the anchorage. The bar of the River Bimbia is two miles broad, extending to the south-eastward of the islet, and has on its shoalest part 13 or 14 feet water; within the bar there is a depth of 4 to 7 fathoms. It is said that to the westward of Bimbia Point are also three small islets, in the form of a triangle, affording anchorage between them in 7, 8, or 9 fathoms.

CAMAROENS AND MALIMBA RIVERS.—Vessels bound to the River Camaroens, or thereabout, commonly make the northern point of the Island of Fernando Po, which shall be hereafter described, and shape their course accordingly. From the River Bimbia to that of Camaroens, a distance of 11 miles, the coast is low and covered with trees. Cape Camaroens, the north point of the entrance, is also of this description, as well as Point Suellaba, the south extremity; the two points bear S. by E. $\frac{1}{4}$ E. and N. by W. $\frac{1}{4}$ W. (S.E. $\frac{1}{4}$ S. and N.W. $\frac{1}{4}$ N.), 7 miles from each other; but the shoal grounds extend half-way across the entrance and narrow the channel, which lies on the north side: this spit has a chain of heavy breakers, named the Dogs' Heads, which may be seen a great distance, and require a good berth, as the

* A pilot must always be obtained when making the rivers on this coast as no directions can for any length of time be of service, in consequence of the frequent shifting of the sand-banks.

tide sets over them with rapidity. The north point of Malimba River bears, from the inner extremity of Cape Camaroens, E. $\frac{1}{4}$ S, $9\frac{1}{4}$ miles, and the south point S.E. by E., $9\frac{1}{4}$ miles. On entering give the Camaroens' land a berth of half a league, and you will sail in the best water into the estuary of the two rivers, with Malimba Point nearly east, until a sandy islet, bearing S.S.W. $\frac{1}{4}$ W., and Point Suellaba are in one: here you will have 4 or 5 fathoms of water in the stream of the two rivers, two miles below a long spit of sand extending from Malimba Point $4\frac{1}{4}$ miles below that point; the inner point of Camaroens bearing W.N.W. $\frac{1}{4}$ W., 5 miles. Greenpatch Point, on the east side of Bimbria Creek, appearing between that and Mordecai Creek, N. by W. $\frac{1}{4}$ W. Gallows Point, on the north side of Camaroens River, N.N.E. $\frac{1}{4}$ E., and Malimba Point nearly East. From this roadstead you may proceed up Camaroens River, by bringing the rugged trees on the east of Gallows Point to bear E.N.E., and run directly for them, until you get over the flats of $2\frac{1}{4}$ fathoms that form the bar of the river; and as soon as you deepen the water to 3 and $3\frac{1}{4}$ fathoms, you enter into what is named the Old Hole.

Eight miles beyond Gallows Point is Enguias Point, and 3 miles below it, on the same side, is Mungo Creek; by bringing the point about two ships' length without the bushes at the water's edge, below the creek, you clear the middle grounds of the river, and advance within a musket-shot of the north shore, at the rugged trees near Gallows Point. Proceeding upwards, about two miles above those trees, steer more for the mid-channel, keeping the gap up the river about a sail's breadth open; you may then run up to the road off King George's Town, on the south shore, taking care to give a good berth to Doctor's Point, which lies 3 miles below it. The anchorage off George's Town is in 5 fathoms; the tide flows in the road, on the full and change, at 6 o'clock, and the rise is between 8 and 9 feet. It is high water at Cape Camaroens at half-past 5 o'clock.

The River Borea is distant 16 miles, S. $\frac{1}{4}$ E. from Suellaba Point; the coast between is low and well wooded, and continues so to the termination of the BIGHT OF PANNAVIA, which ends 38 miles, S. by E. from Borea River; this river is only navigable for boats, being rendered impassable by a bar at the entrance.

RIVER CAMPO.—In the bottom of Pannavia Bight a vessel may safely anchor near the shore in 4 or 5 fathoms, muddy ground. From Point Garam, known by its cascade, at the south end of the bight, the coast trends to the Rio Campo, S.S.W. $\frac{1}{4}$ W. 13 leagues; this river may be recognised by two mountains to the northward, named, from their similitude, the Saddle and Table Hills, the former lying to the northward of the latter. On the south point of the river the sea breaks with much violence on a shallow stone bank that appears at low water. There is good anchorage in 4 to 6 fathoms, $4\frac{1}{4}$ leagues from the River Campo in the Cove of Bata. At this place you will see the Seven Hills, lying in a row, about 6 leagues inland, the middle one appearing higher than the others.

The RIVER ST. BENITO lies 16 leagues, S.W. $\frac{1}{4}$ S. (S by W. $\frac{1}{4}$ W.) from the Rio Campo; its entrance is narrow, but it has not less than 3 or 4 fathoms which extends 4 miles within it. The Heybern is a high hill which renders the north point remarkable; the south point is distant two miles from it, and is steep-to; a reef extends along the coast, having rocks over and under water, to the inward of the river. From the River Benito to Cape St. John, bearing S.W. $\frac{1}{4}$ W. (S.W. by S.) 10 leagues, the coast is irregular, rocky, and foul, and is distinguished by a high mountain inland, named the

Mitre Hill. As you approach about half-way to the cape, the coast, from being low and woody, is rocky, and the cape itself is surrounded by a ridge of rocks, and has a small stony bank of 7 or 8 fathoms lying 2 or 3 miles from it.

CORISCO BAY.—The N.W. point of Corisco Bay bears S. by E. $\frac{1}{4}$ E. (S.E. $\frac{1}{4}$ S.) one league and a half from Cape St. John; to the southward lies Corisco, or Thunderbolt Island, which is more than 3 miles long and 2 miles broad. It is a low island overgrown with high trees, that seem to stand in the water; about a mile from its S.W. side is a small islet, named Laval, encompassed with a reef; from the S.E. end of Corisco extends a narrow reef, half a league to the eastward, and a shelf also extends from the northern shore. The north point of Corisco Bay assumes a semicircular form, 4 leagues in breadth, and into the N.E. side falls the River Mooney, or Rio de Angra; this river is a mile wide, and at a distance of 5 miles from the entrance lie a cluster of islets, rocks, and shoals, named the Elobey, or Mosquito Isles. In the direct course between the depths are from 6 to 5, $4\frac{1}{2}$ to 3 fathoms, but more to the south are several shoal spots of 2 and $2\frac{1}{2}$ fathoms; the least depth on the bar is 13 feet.

Corisco Bay trends nearly due south from the River Mooney, 7 leagues, to the River Moondah, which is 5 miles in breadth; the water is shoal at the distance of 3 miles from the coast in this space. At the entrance of the Moondah are 3 to 5 fathoms. The entrance bears S. $\frac{1}{4}$ E. (S.S.E.) 28 miles from the N.W. point of the bay; and from the western point of the river to Cape Esterias, the coast trends W. $\frac{1}{4}$ N. (W.S.W. $\frac{1}{4}$ W.) 4 leagues. Little Corisco Island bears S. by E. $\frac{1}{4}$ W. (S.E. $\frac{1}{4}$ S.) 5 miles from the S.W. point of Corisco, and is surrounded by several shoals, as well as the flat that stands a league and a half to the S.W. Between Little Corisco and Cape Esterias there is a channel of 5 and 6 fathoms, but the water shoalens half-way over from the south shore, as the coast about the cape is foul and rocky; but from hence to Point Clara, at the entrance of River Gaboon, it is in general bold distinguished by trees, and at half a league distance, varies in depth from 7 to 6 and 5 fathoms.

RIVER GABOON.—Point Clara is distant 7 miles S. by W. $\frac{1}{4}$ W. (S. $\frac{1}{4}$ E.) from Cape Esterias; and although the coast between is pretty clear, yet about the point itself are several sunken rocks. On the south side of the river is Sandy Point, which bears S. $\frac{1}{4}$ W. (S. by E.) 10 miles from that of Clara. King Qua Bens Town stands on the eastern shore, facing the sea, S. by E. $\frac{1}{4}$ E. (S.E. $\frac{1}{4}$ E.) 3 leagues from Point Clara; and King Glass Town stands $3\frac{1}{2}$ miles S. by E. $\frac{1}{4}$ E. (S.E. $\frac{1}{4}$ S.) from the former. About a league N.W. of Sandy Point are several shoal spots, which vessels coming from that side must avoid. Coming from the northward, you may approach within half a league of Point Clara, making allowance for the stream of the river, which sets strongly on that side; the bottom, as you approach, is very irregular and rocky, as you will at all times have 15 or 16 fathoms, and at the next cast have only 5 or 6 fathoms. The course in is S. by E. $\frac{1}{4}$ E. (S.E. $\frac{1}{4}$ S.) 5 leagues, towards Oweendo or Red Point, which is S. by E. (S.S.E. $\frac{1}{4}$ E.) $6\frac{1}{2}$ miles from King Glass Town. Two miles south-eastward of Red Point is Darnbee or King's Island; and $3\frac{1}{2}$ miles south-eastward of this is Parrot or Embene Island, between which are 6 and 7 fathoms.

Round Corner Point is 4 miles S.W. by W. $\frac{1}{4}$ W. (S.W. $\frac{1}{4}$ S.) from Sandy Point, and is distinguished on each side by elevated land, which serve as good marks for the Gaboon. Vessels coming from the southward should *give this point a good berth*, and steer towards Point Clara, in order to

avoid the shoals lying to the N.W. of Sandy Point. There is anchorage in 5 to 6 fathoms, a mile from the shore, anywhere between Cape Clara and King Glass Town.

WINDS, &c.—In the Bight of Biafra, from June to October, the winds often vary much from S.S.W. to S.S.E., in the course of the day, so as to render it advisable, for vessels beating to the southward, to tack accordingly, and take every advantage of a slant: it may likewise be well to stand in for the shore after midnight, for the benefit of the land-wind, which sets in toward the early part of the morning. The current commonly runs to the northward, about 18 miles in the 24 hours, but with the change of the moon it sometimes varies to the southward.

Vessels from Calabar River to Sierra Leone are sometimes prevented, by contrary winds, from proceeding by the N.W. of Fernando : o, and in that case they may pass to the eastward of that island, and avail themselves of a strong current setting to the southward; they may pass either to the eastward or northward of Prince's Island as the winds permit. To the westward of this island, the current generally sets strong to the N.E., at the rate of a knot and a half. Having arrived to the southward of Prince's Island, if the ship will lie no higher than W.N.W., tack immediately, and endeavour to cross the equator, by which you will keep out of the strong N.E. or Guinea current, that sets towards the Bights of Benin and Biafra.

Having crossed the line, you are nearly out of the easterly current, and in about the parallel of 1° S. will find it setting to the westward at a rate of about one mile an hour. In May and June, when the sun has a high declination, the trade-wind is to the southward, and you will not gain the regular breeze nearer than 3° S., when it commences from S. by W. As you make westing the wind will be found to haul more to the southward and eastward, and the current increases to the rate of a knot and a half in an hour, until you arrive as far as 15° W.: do not get to the eastward of this meridian until you reach the parallel of $8\frac{1}{2}^{\circ}$ N., when you may steer direct for the cape, your soundings varying from 20 to 12 fathoms, as you approach within 6 or 7 leagues of it.

THE ISLANDS OF FERNANDO PO, PRINCE'S, ST. THOMAS, AND ANNO BON.

FERNANDO PO.—This island is about 12 leagues in length, from north to south, between the parallels of $3^{\circ} 12' 30''$ and $3^{\circ} 47' N.$, and 6 leagues in breadth, and is unusually high, so that it may be distinguished at the distance of 20 to 25 leagues. An English settlement was established here in 1827, which, in honour of his Royal Highness the Duke of Clarence, was named after him, and which appears to be in a prosperous condition, though by some it is considered doubtful whether it may be attended with any ultimate advantage. It has been stated that the island of Fernando Po, made in three hummocks; but this mistake has been occasioned by the high land of Camaroens, which may be taken for the island at a distance. On coming from the N.W., it makes in two high peaks, the eastern one being the highest, and terminating in a sharp point; the westernmost is round in the top, sloping gradually to the water's edge.

GEORGE BAR, on the west side of the island, is situated about 7 leagues to

the S.W. of the N.W. Point, between Point Kelly on the N.E. and Charles Folly on the S.W., which are 7 miles distant from each other; the bay is of a semicircular form, much exposed to the N.W., and the depth decreases from 30 to 20 and 10 fathoms. Goat and Kid Islands lie about half a league to the northward of Point Kelly, and are encompassed with several rocks, but the ground on the S.E. is clear, and affords convenient shelter. Vessels from Bonny River, bound to George Bay, should make the west end of the island, as a strong current sets to E.N.E., and with baffling winds may take you several days to get up, if you once get to leeward. In making the island, you will perceive its appearance as we have already stated; but should you fall to leeward, so as to bring the eastern peak to bear East, or E. by S., you must tack, and close in with the westernmost shore, giving it a berth of one or two miles, until you get in sight of Goat Island,* the soundings gradually diminishing to 16 or 15 fathoms. Anchor with the east peak bearing E. $\frac{1}{4}$ N., Goat Island N. by E. or touching Point Kelly, the N.E. point of the bay, and Charles Folly W. by N. $\frac{1}{4}$ N., three-quarters of a mile from shore. Water and wood may be had here in abundance, and fish is also plentiful and various.

MAIDSTONE BAY AND CLARENCE COVE.—Maidstone (or N.W.) Bay lies within the N.W. Point of the island, and is a shallow bay, $2\frac{1}{4}$ miles in extent; it is bounded on the eastern side by a tongue of land, now named Point William, between which and Point Adelaide, distant half a mile S.W. by W. $\frac{1}{4}$ W., is *Clarence Cove*: this latter is a small bay of a semi-circular shape, having soundings in the middle from 14 to 12 fathoms. Cockburn Cove lies on the west of Point Adelaide, and is not so large as that of Clarence. Adelaide Islets lie in a cluster, about one-tenth of a mile to the northward of the point, being divided from it by a passage of 9 and 10 fathoms; a bank extends some distance from the islets, but it has not less than 3 or $3\frac{1}{4}$ fathoms; a shoal also extends to the westward of Point Williams; and on the east side of this point is Goderich Bay, not more than three-quarters of a mile in extent, indented by several small coves, and in which are some rivulets, two of which are named Hay Brook and Horton Brook. It is high water, at the full and change, at Clarence Town at 4 hours; rise 7 feet.

The following remarks on Clarence Cove are by Commander Fishburne, H.M. Steam-vessel *Alban*, 3rd December, 1841:—"The anchorage of Clarence Cove, the principal anchorage of Fernando Po, situated on the north side of the island, is very good, though the depth is from 10 to 15 fathoms; indeed, it is so abundantly sheltered, that considerable facility is afforded to vessels loading or unloading, while the perfect tranquility and smoothness of the water, and rise of 7 feet, admit of vessels being beached for repairs, without danger. At present a fire is kept by the Company's servants during the early part of the night, and being at the height of 100 feet above the level of the sea, it may be seen at a considerable distance. By bringing this on a S. by E. (true) bearing, and Point William one mile or a mile and a half distant, fair anchorage and a good position for entering will be found. It must be borne in mind, that the current runs to the East and N.E. generally, one mile to a mile and a half per hour; and due allowance must be made for this, in steering either for the settlement by day, or the light by night, depending on the preceding winds. Change in the bearings would give notice of this and they should be attended to strictly.

The water is good, and may be obtained in any quantity without difficulty.

* At $5\frac{1}{4}$ miles to the northward, and 2 miles from shore, nearly on the meridian of Goat Island, is a reef, about one mile in extent, true North and South, and steep-to.

Wood is plentiful, and of very superior quality, quite equal to the mangrove, 340 inches per horse-power, per hour, being sufficient to keep steam with our engines working expansively at half-stroke, yet still an efficient fuel. We paid six shillings and sixpence for 100 pieces, containing about 33 cubic feet; but were a contract entered into for a large quantity, it might be obtained at a much more reasonable price. The landing-place is convenient at a wooden pier, which has been built at the expense of the West African Company, and extending out to depth of water that admits of vessels of 7 or 8 feet draught to go alongside. The ascent to the plateau, upon which the town stands, being about 100 feet, and the road ill made, occasions much difficulty in the transfer of goods to the town, but this objection might be materially removed, and without much expense. There is a strip of land, and on either side of the landing-place, (from which the cliffs rise nearly perpendicular) now partly occupied by miserable coal and store sheds, but of sufficient width, and generally adapted for good store-room.—*Nautical Magazine for 1843, page 83.*

The natives of Fernando Po were not considered of a friendly nature, but we hope the new settlement will prevent mariners experiencing any inconvenience from this trait of character, and be the means of subduing the angry disposition which was said to exist among them.

PRINCE'S ISLAND.—This is an irregular-shaped island, 10 miles in extent from north to south, and 5 miles wide. Should the current, on approaching the island, be found running to the N.E., it will be best to make it on the south side, or you may be swept to leeward, and experience some difficulty in making the harbour; but it will be better to make it on the north side, with a south-westerly current. Vessels approaching the north side of the island will see a high peak towards the S.W. end, appearing like a sentry-box; and, more to the eastward, a remarkable round-topped hill, of a sugar-loaf shape, named the Parrot's Bill. In approaching the south side, there is a high white rock or islet, lying half a league from the south point, named the Dutchman's Cap, and about 9 miles south-westward of this are the rocks above water, named the Brothers.

PORT ST. ANTONIO lies on the N.E. side of the island, the entrance to which is distant $8\frac{1}{4}$ miles from the Dutchman's Cap. The anchorage is clear, and the depth of water regular from 10 to 4 fathoms. It is exposed to tornadoes, but as the entrance is narrow, accidents rarely occur; it is, however, necessary for vessels to be well secured, for they blow directly in. The entrance is defended by two small forts, and is of easy access; in going in you may stand to the south shore in 6 fathoms, and to the north shore, it being steep-to, in 10 fathoms. There is a coral reef of 5 fathoms, a mile and a half from the fort on the south side; about a cable's length without that, are 9 and 8 fathoms, soft mud, and good holding-ground, to one or two miles farther in. Ships should moor with an open hause to the sea, in order to be prepared for the tornadoes. The town stands at the bottom of the harbour.

On arrival, the vessel must be reported to the governor, who sends custom-house officers on board, at the ship's expense; and, on quitting the harbour, forty dollars are exacted for port-dues and anchorage; in addition to which, if coming to trade, the customs demand forty more.

AGULHAS, OR WEST BAY, lies about half-way down on the western side of Prince's Island. It is about two miles in extent from N.E. to S.W., shoaling in depth from 20 to 4 fathoms. Some small rocks under water extend from its south point. The best situation to anchor in this bay, is with its west point bearing W.N.W., distant three-quarters of a mile, the north point N.E.

by E., and a peak on the island S.E. by E. $\frac{1}{2}$ E. There are several good streams of water on the south side of the bay. This place is secure from *travardoes*, though open to N.W. winds, but the latter seldom occur.

Pedrim. Barriga. Carrista. The Peak. Pedra das Angulhas.



E.N.E.

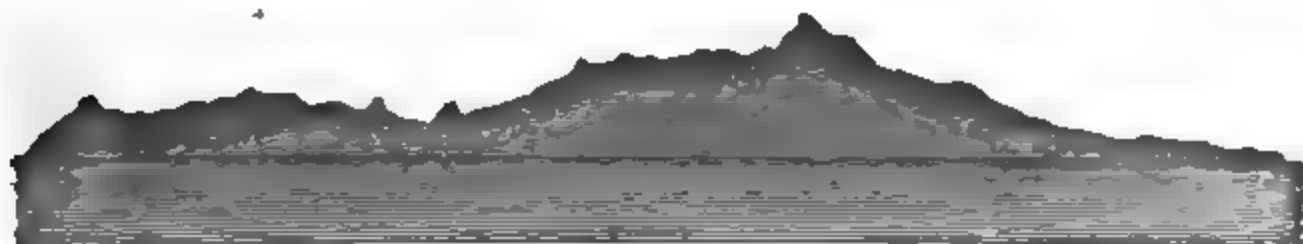
S. $\frac{1}{2}$ E. (Pereira House.)

Prince's Island, West Bay (taken from the Anchorage).

In the vicinity of Prince's Island, the winds are generally between the south and west; in sailing, therefore, out of the harbour, or port St. Antonio, with a land-wind, endeavour to get under weigh with this breeze, keeping well over towards the south shore, for, on advancing outward, the wind will be found to draw gradually to the southward, which, with the swell, may set you over to the north side, near the Diamond Rocks. If bound to the westward, you need not beat to the southward of St. Thomas; but if to windward of Prince's Island, and the wind admits of your making westing without northing, keep on the port tack, and so proceed as to take advantage of the equatorial current.

About Prince's Island are several rivulets of excellent water, but it does not equal St. Thomas, for the goodness and abundance of its provisions.

ST. THOMAS.—This island bears about S.W. by W., 22 leagues from Prince's Island. It is 8 leagues in extent from north to south, of an oval form, with the south point nearly on the equator. It is high, conical, and well wooded; its highest peak is usually covered with a cloud, and appears like smoke. Vessels from the Windward and Gold Coasts, bound to St. Thomas, must choose the time of the ventanias, or hard breezes, which blow from April to September, and make proper allowance for the currents.



St. Thomas Island, bearing W.S.W. 7 leagues.

MAN-OF-WAR BAY, on the N.E. side of St. Thomas' Island, is considered a safer anchorage than that of St. Anna de Chaves which is more to the south-eastward. Vessels coming in along the north end of St. Thomas, will perceive the land mountainous and very high; when abreast of the island, it sometimes seems divided in two, and it will then be proper to keep to the E by S. till you are past Cabrita Island, which separates one anchorage from the other. Man-of-War Bay is a safe place for small vessels, but large vessels are obliged to lie out in the open road, in 10 to 18 fathoms, which is a safe place, except during the season of the tornadoes, as they prevail from N.E. directly upon the shore. Anchor in the bay, with Cabrita Island (which

makes like a saddle) bearing S.E. $\frac{1}{4}$ S.; Misericorda Chapel, seated on a hill, on with a black rock on the shore, S. by W.; and the white mansion, named Fernandilla House, S.W. $\frac{1}{4}$ W. The ground in the bay is good, and the water in general smooth, except during the season before mentioned; the soundings in are irregular, from 30 to 6 fathoms, which latter depth is about one mile from shore. From the anchorage the watering-place is about a quarter of a mile to the eastward, and is easily obtained.

ST. ANNA DE CHAVES BAY, OR ROADSTEAD, is defended by a stone fort, stand- at its southern entrance. In sailing to this place you will find it best and most convenient to stretch round the south part of the island, for then you will be favoured by both wind and current, which latter sets strongly to the northward; and the shore, to the southward of the fort, may be approached with greater safety than that to the northward, though not within the distance of one mile and a half, until you get the fort to bear W. by N. About two miles to the eastward of the town lies a shoal of white sand, with only $2\frac{1}{2}$ fathoms over it, on which the Chesterfield struck in 1781. This ship went round the northern part of the island, obtaining no ground at 60 and 50 fathoms, until the rocks were seen alongside of the vessel; soon after this she sounded in 16 fathoms, and suddenly grounded. When aground, the fort bore W. by S., Cabrita Island N.W., and the eastern point of the island S. by W., distant from shore about 4 or 5 miles, and from Cabrita nearly 3 miles. Being hove off this shoal, she steered for the road, bringing the fort to bear from W. to W. by S., anchoring in 6 fathoms, sand, shells, and coral rock, the fort bearing W.S.W., Cabrita Island N. by W. $\frac{1}{4}$ W., south end of St. Thomas S. $\frac{1}{4}$ W., and its northernmost point N.W. $\frac{1}{4}$ W., about two miles distant from the shore.

The Tartar anchored in $5\frac{1}{2}$ fathoms, the fort bearing S.W. by W. only one mile from shore; the Blandford much farther out, and the Grampus found good anchorage in 6 fathoms, the fort bearing West, and Cabrita Island N.N.E. It thus appears that vessels coming in from the northward, must not depend upon the lead, because, from no ground a ship may have 12 fathoms, and be aground before they can obtain another cast of the lead.

ROLAS ISLAND lies about two miles off the S.W. end of St. Thomas, the channel between lying directly under the equator, and affording safe anchorage for the largest vessels. It must be entered from the eastward, as a bank extends from the north shore of the island. About 5 miles eastward from Rolas Island, is a cluster of high rocks, appearing from the northward like ships under full sail, named the Seven Stones, or Brothers, which are sometimes mistaken for part of the island itself.

Vessels from the northward, and bound to St. Anna de Chaves Bay, should make St. Anna's Isle, or Postillion Cap, which lies off the eastern coast; and when this comes in sight, you will perceive a small black fort in ruins, on the shore towards the S.W.: steer for the latter, until St. Anna's Isle comes in a line with the low green point, to the southward of the black fort; and with this mark on, bring the new fort or castle, on the S.E. point of the bay, to bear W.S.W.: here you will have 6 or 7 fathoms, sandy bottom, distant a mile and a half from the castle, with Cabrita Island bearing N. by W. $\frac{1}{4}$ W. Ships should not approach Cabrita nearer than to bring the new fort to bear S.W., for beyond that bearing the water is shallow, full of coral branches, the depth not more than 10 or 12 feet.

ANNO BON is a high circular island, about 8 leagues in circumference, situated about a degree and a half to the southward of the equator, in the meridian of $5^{\circ} 45'$ E. The anchorage is on the N.E. side, abreast of the town, in 7 to 16 fathoms, white sandy bottom, which holds well. If you

moor near the shore, the mark is a round islet, of a sugar-loaf form, between which and the land there is a fair channel: here you will perceive seven rocks above water lying near the shore. Anno Bon is considered healthy, and affords abundance of fruit, vegetables, and other provisions, all of which may be had cheap in barter. There is a rivulet of good water at the south end of the island, but it is rendered somewhat difficult of access.

ANCHORAGE OF ANNO BON.—*Extract from the Nautical Magazine for 1843, page 89.*—Commander W. B. Oliver says, “Open the low rocky point, to the westward of Pyramid Rock, with the east end of the church, (the eastern building detached from the village); you may then, by keeping Pyramid Rock on with a high rock over it, resembling a fort, steer in on that line, and carry sandy bottom from 19 to $3\frac{1}{2}$ fathoms, within two cables’ length of the beach, when Islet Point will bear W. $\frac{1}{4}$ N.; Pyramid Rock S.E. by S., and Turtle Island S.E. by E.”

The Vansittart anchored in May, 1821, at Anno Bon, in $11\frac{1}{2}$ fathoms, rocky bottom, with a conspicuous peak in the centre of the island bearing W. $\frac{1}{4}$ S., off shore about three-quarters of a mile. Ships touching here should keep the lead going, the soundings being very irregular, with great overfalls from 19 to 11 fathoms, then $3\frac{1}{2}$ fathoms. Although the vessel here stated lay in $11\frac{1}{2}$ fathoms, a small anchor was necessary to steady her, and keep the bower anchor clear; for half a cable’s length in shore there was only a quarter less 3 fathoms, rocks.

THE GOLD COAST.—The following remarks on a voyage to the Gold Coast are by Captain Midgley.

“The extensive tract of sea between the meridians of 14° W. and 9° E., and the parallels of 9° N. and 3° S., is yet imperfectly known by the majority of navigators: being bordered by a range of coast, in a great measure peopled by an uncivilized and semi-barbarous race, who require peculiar address and management in the method of dealing with them for the produce of their country. I shall suppose that a vessel bound to this coast has got out of the Channel, or, at least, clear of Tuskar and the Smalls, in which case the master’s mind will be comparatively at ease to what it was when he had less sea-room in the narrows of the Channel. But whilst the ship is in soundings she will be more or less exposed to a Northerly or N N.E. indraught of tide or current, which sets nine hours out of every twelve, even at a considerable distance to the westward of Scilly, and this indraught is liable to be augmented or retarded by the direction and force of the wind.

The stream named Rennell’s Current sometimes sets strongly to the N.N.W. and N.W., about the edge of channel soundings at other times very weak, and there is occasionally a strong set to the eastward. But it is highly probable that Rennell’s Current will be found to prevail for some days after a long series of westerly gales, as these winds materially contribute to accelerate the velocity of the currents setting into the Bay of Biscay, and by keeping up the level of the water upon the iron-bound precipitous shore of the bay itself, forces that water to find an egress out of the bay to the northward and westward; and it is not improbable that the ebb-tide of the English Channel may in some measure contribute to its westerly tendency.

To the southward of the 48th parallel, it is very probable that there will be found a south-east current, the velocity of which will gradually increase until the 40th or 38th parallel is attained, where I have generally found this cur-

rent to get weaker, and vary more to the eastward. On the 11th of February, 1833, I threw a bottle overboard, containing the vessel's position in latitude $41^{\circ} 50' N.$, and longitude by chronometer $14^{\circ} 28' W.$, and this bottle was picked up in the entrance of the Harbour of Vigo on the 1st of March following: it had consequently traversed 80 leagues in a true E. $\frac{1}{4}$ N. direction, or about 14 miles per day.

I would strongly advise all mariners bound to the southward, to pass to the westward of Madeira, if possible; as it may prevent their being entangled with the Canary Islands.

On the 29th of December, 1840, the ship John Campbell was in latitude $33^{\circ} N.$, and longitude $19^{\circ} 24' W.$, about 2° to the westward of Madeira, and with a light wind from S.S.E.; the ship, about 2 p m., got suddenly amongst some rollers. At first these rollers did not appear alarming, as the vessel, on her gradual approach to them, seemed to be only experiencing a gradual rising sea. But the rollers soon attained a considerable height, and set in regular ridges from the north-west quarter, toppling in many places like a bore, and causing the vessel to labour and roll heavily to windward. In the evening there was an increasing breeze from the south-west, with cloudy overcast weather, and much vivid lightning in the N.W. quarter. As the weather had been moderate for several days before, I can scarcely think these rollers could have been caused by wind, as they were very unlike the sea that marks the termination of gales of wind: they came in regular ridges, and sometimes topped in a considerable breaker. The ship was suddenly among them, sailed for 21 miles through them; the rollers rapidly increased, and as rapidly subsided. The sea was of a deep blue colour. No bottom at 70 fathoms; barometer steady at $30^{\circ} 20'$, and the temperature of the air 64° , and of the water 57° of Fahrenheit thermometer.

After much consideration of the subject, I must candidly confess my inability to assign any just cause or reason for this sudden, and to me unaccountable undulation of the surface water; but, perhaps, some such occurrences may have an influence in contributing to the sudden rise of the water, which is occasionally experienced at Ascension, and, I believe, also at some other elevated islands.

It was on the same passage out, and on the 3rd of January, 1841, that I passed through many clusters of the Gulf, or Fucus Natans weed, all of which was very much decayed. The ship was then in latitude $28^{\circ} 8' N.$, and longitude by time-keepers $21^{\circ} 46' W.$; a position, I believe, much to the eastward of the generally assigned eastern limits of the Sargasso Sea, or portion of the North Atlantic, in which this weed is generally found. But as I shall presently have occasion to revert again to this subject, I will proceed to notice the winds and currents usually found in the neighbourhood of the west coast of Africa.

Among the Canary Islands, and in their vicinity, the N.N.E. and N.E. winds mostly prevail; and the general set of the currents between Madeira and these islands has a southerly and S.S.E. tendency. Indeed the whole surface of the ocean, from the 48th to the 30th parallel, has a general tendency to flow to the eastward and south-east quarter; and the mariner will do well to guard against its treacherous and too often fatal influence.

Outward-bound African vessels have of late, very generally, and very properly, run through the passage to the eastward of the Cape de Verd Isles, for by so doing they avoid a tract of sea, which is notoriously subject to violent squalls, calms, and heavy rain. Vessels make this run in the general limits of the north-east trade-wind, and I have myself invariably found the current setting to the southward. I am aware that I have the high authority

of Mr Finlayson of the Royal Navy, and of Commander Wilkes of the United States Exploring Expedition, against me in this assertion, both of these officers having found currents in this route setting to the north-east. I must add that I have not tried the current by any actual experiments, other than the usual method of estimating it by the difference found by an attentive dead-reckoning and actual observation; and in this case it is of course very possible that errors creep into the reckoning, by inattention to the steerage, particularly in the night, as well as by an improper allowance for the magnetic variation, an inaccurate log-line, and other causes.

Vessels bound to the Coast of Africa, in the wet season, or between May and September inclusive, need not be too anxious to make easting, for they will lose the N.E. trade-wind very soon after passing the parallel of St. Jago, and after a short interval of calm, will fall in with the variable S.W. winds and their usual accompaniments of squalls, heavy rain, and close damp unsettled weather. In proportion as the vessel advances to the southward, she will find more settled weather, and probably be influenced by a current to the south-eastward: this is a branch of the great Guinea Current, which I shall presently attempt to describe. The track I have just noticed is perhaps the most luminous part of the Atlantic Ocean. In the wet season, vessels should give St. Anne's shoals a large berth to the eastward, as the current, as well as the sea, runs with great velocity into the bight of Cape Mount; and vessels which may unfortunately happen to fall in with the land to the northward of Sinou, in the wet season, will find considerable difficulty in working to the southward.

The first influence of the Guinea Current will be found in about $9^{\circ} 30' N.$ and inshore of the 22nd meridian, and gradually verges from thence in a S.S.E. and S.E. direction, running with considerable velocity in a parallel direction to the trend of the land, and at least 50 leagues from it. On approaching the land the current will be found to increase in velocity, and requires constant and unremitting vigilance to prevent the vessel running to leeward of her destination. On the 18th of January 1841, in latitude $6^{\circ} 48' N.$, and longitude $14^{\circ} 58' W.$, whilst in the influence of the Guinea current setting true S.E. by E., at the rate of 30 miles in the 24 hours, at daylight in the morning, during a perfect calm, I was surprised to see the vessel surrounded by sprigs of the Sargossa weed, and was still more surprised at its fresh and luxuriant appearance. One of the many sprigs brought on board contained two very lively little crabs, and I observed no marks of decay about any of the weed. I ordered a cast of the deep-sea lead, but found no bottom, at very nearly 100 fathoms. Sir Hans Sloane, in his History of Jamaica, says that this weed has been seen upon the Coast of Africa; but I am disposed, notwithstanding, to think that it is of rare occurrence, as I had four very intelligent natives of the Krou Coast of Africa on board, and they unanimously declared that they had never seen any Sargossa weed, or indeed any other weed similar to it, attached to any of the rocks, or floating upon the surface of the water near the coast.

From the shoal of St. Anne (which by-the-by requires the exercise of considerable judgment and caution) the Guinea Current has an easterly and E.N.E. tendency towards the bight or bay of Cape Mount; to the southward of this it sets about E.S.E. along the shore; and from Grand Sestros to Cape Palmas it runs with a velocity of more than two miles an hour. It is this current which has set several vessels upon Coley's Rock, and Cape Shoal, and Rock Town Reef, in the neighbourhood of Cape Palmas; and these dangers *can only be avoided, in the night, by the constant and unremitting use of the lead; for by keeping in 38 fathoms, or any greater depth of water, the vessel*

will drift in a fair way round the cape, and be 3 miles clear to the southward of these dangerous reefs. On the meridian of Cape Palmas the mean breadth of the easterly stream of current is fully 45 leagues, and it keeps this breadth throughout the whole of its easterly course, until it is lost in the Bight of Biafra. The inshore branch of this great stream diverges to the northward and eastward at Cape St. Paul, and fills up the Bight of Benin, from whence it runs with increased velocity round the land of Formosa, and over the great bank of soundings which extend from the mouth of the Nun River to the Mountains of Cameroens. Between the meridians of $8\frac{1}{4}^{\circ}$ W. and nearly $9\frac{1}{4}^{\circ}$ E., a distance of more than 1000 miles, we are presented with the somewhat singular anomaly of two mighty streams of water, silently, yet certainly pursuing their course parallel to each other, but in directions diametrically opposite. I of course here allude to the equatorial current, which sets to the westward, as I shall hereafter show, with considerable velocity. The mean northern boundary of the equatorial current is generally found about the equator, or about 110 miles from the southern border of the opposite stream. In the tract of sea between these streams the current is variable, but has a general tendency to run to the northward, particularly abreast of the Bight of Benin.

It is a well-known fact that during the wet season, or from May to October, the Guinea Current almost invariably runs to the eastward with increased velocity. I can rationally account for its ingress and egress in the Bight of Benin; but the whole of this immense body of water appears to be confined in the Bight of Biafra, or at least it has no known outlet, for throughout the whole of the bight, to the northward of Prince's Island the current, in the wet season, almost invariably sets to the N.E. and E.N.E. with such force that vessels are frequently fourteen days in beating up from Bonny to Prince's Island, a distance of only 60 leagues. I am aware that Mr. Finlayson has asserted that a strong current runs to the southward out of the Rio del Rey; but this current is not found to the southward of Fernando Po. On the contrary, the current upon the east coast of the Bight of Biafra generally runs strong to the northward, and I have been three days, in tolerably smart vessels, and with a constant steady breeze, in weathering the island. The only advantage I ever found in beating up through the eastern passage was derived from the smoothness of the water, and not from a southerly current. How then do the accumulated waters of the Bight of Biafra escape? Is there an undertow, or is it the great reservoir which supplies the tides of the 23 large rivers in the bights, most of which are so many mouths of the Niger?

The bank of soundings along the Krou Coast, from Liberia to Cape Palmas, extends only 7 or 8 leagues from the land; and on its extreme outer edge, which is very abrupt, there is a depth of 55 to 62 fathoms, generally sandy bottom, or sand and oaze. At only one mile to the westward of this depth there is no bottom at 90 fathoms, and the water continues of the deep-blue oceanic colour, even in 15 fathoms. On this part of the coast no vessel should shoal her water under 32 fathoms in the night, and in the neighbourhood of Cape Palmas, as before observed, not less than 38 fathoms. In this depth of water the sand on the beach will be distinctly seen, and the vessel, if in the early part of the day, will be soon surrounded by canoes. A fire on the beach is a signal that the natives are desirous of trading. The natives of this part of the coast are of mild and gentle demeanour, and any number of them may be allowed to come on board the vessel without the slightest reservation, for they have no spirits in their possession to sell to the crew.

The Kroumen are in many respects an extraordinary race of people ; and Capt. Adams has justly remarked that the tower of Babel might have been built upon the western shores of Africa, as a different language is spoken at every 10 or 12 miles, though these different languages are generally understood by the natives all along the coast. The Kroumen have a singular custom peculiar to themselves, which is a system of apprenticeship. A number of young men will attach themselves for a certain period to a headman : this headman has made one or more voyages to leeward to the Oil Rivers, before he can obtain a name, or be allowed to build a house, or to trade ; and it is the duty of the headman to ship the boys off for the Oil Rivers on board of any vessel he can, and for this service the headman is entitled to the one month's advance always paid by the ship ; he is also entitled to a certain portion of the boy's wages on his return. When the boy has made two or three voyages, and speaks English fluently, he becomes a headman himself. The language of the Kroumen is principally a combination of vowels, and from the peculiar nasal pronunciation can rarely be acquired by Europeans. The Krouman is generally found faithful in a strange country, but must not be trusted in his own.

In proportion as the vessel advances to the eastward, the natives will be found more barbarous and consequently more treacherous ; and about Drewin and St. Andrew's they were formerly a fierce, unruly, and sanguinary race, notorious for their treachery, and repeated attacks upon vessels. I have had no intercourse with these people for the last seven or eight years, but am assured that their condition and manners are very much improved, and that small vessels may now trade there for ivory and palm oil in perfect safety, by adopting only common precautions. The St. Andrew's people have been repeatedly fired upon by the crews of different vessels, for various acts of theft and treachery ; and it was formerly very unsafe to allow more than five or six of them on deck at once, as they generally come on board armed with a long knife, in the use of which they were very dexterous. Upon one occasion, I very suddenly dispersed a multitude of them off the deck, upon the very point of open warfare, by merely throwing about a dozen heads of leaf tobacco over the side, for they all immediately jumped overboard after it. Upon another occasion, the plentiful distribution of boiling water amongst a crowd of them proved quite as efficacious. On board a French barque, where two of the crew had been wounded by the knives of the natives, they were beaten off with empty glass bottles, a large quantity of which happened to be on deck at the time for trading with. Harsh as these measures may appear, they are surely more humane than the use of cutlasses and muskets.

The natives of Cape Lahou, in many respects, resemble the Kroumen in their manners and disposition, and, like them, are almost amphibious. Cape Lahou may be considered the western extremity of civilization, on this part of the coast of Africa, for the Gold Coast may be here said to commence. The first Englishman who visited this part of the coast for the purpose of trade, was Captain John Lok, in 1554, but it is very probable that this coast was known to the Portuguese at a much earlier period ; for it is on record that they settled at Accra in 1492, and much about the same period, or about the latter end of the 15th century, the Portuguese discovered Fernando Po.

The best gold upon the coast of Africa is found in the neighbourhood of Grand Bassan and Cape Apollonia. It is tolerably good at Dixcove, Cape Coast, and Anamaboo, and the Accra gold is generally considered of inferior quality ; but little, if any, gold is found to the eastward of the River Volta.

From Ningo to Old Calabar River, an extent of coast of several hundred miles, there is not a single stone to be found that is as large as a walnut. And from the River Sherbro' to Cameroens, an extent of 1500 miles of sea coast, there are only four eminences which exceed the height of 300 feet, and these are the high lands of Capes Mount and Mesurado, and the Cook's Loaf and Devil's Hill, near Winebah. A very old authority, Governor Dalzeil, has truly said, that from the river Sherbro' to Benin, a tract of 1400 miles of sea coast, there is not one navigable river, bay, or harbour, into which a ship can enter. Nor is there one river or creek (the Volta and Lagos excepted) into which a sailing boat can advance 10 miles from the sea. Very few of the creeks will even admit a boat, and not one on the Gold Coast, except at Chama and Elmina: a small boat may row up Chama Creek about 2 miles, and up Elmina Creek about a quarter of a mile. The shores are almost in every part difficult of access from the heavy surf which breaks upon the beach; it is scarcely possible to land anywhere but in a light canoe, and even in that way it is frequently impracticable for days together; in many parts, besides, there is near the shore scarcely water enough for a canoe, and the breaking of the waves becomes there so impetuous that all communication between the shore and the shipping is frequently interrupted for three weeks together, and can seldom be effected with safety.

A most extraordinary refraction prevails upon the whole line of this coast, which is very likely to mislead the mariner, and induce him to neglect the frequent use of the lead, which is the only unerring guide, and sure safeguard all along it. Tornadoes are very prevalent along this coast, from October to April or May, except during the season of the Harmattan or easterly winds, which generally occur in January. They commence with a heavy dark cloud in the south-east quarter, attended with awful lightning and thunder, and always give the mariner ample time to prepare to encounter their dreadful impetuosity. Every common squall from the south-east must not be taken for a tornado, although they are called by that name. There are very seldom more than three or four tornadoes in a season, and when once experienced, are not very liable to be afterwards mistaken. As a general rule, it may be considered, that as the arch of the rising squall is well defined, so in proportion will be the violence of the tornado.

The navigation of the Bight of Biafra presents no peculiar feature to the attention of the navigator, if I may except the strong north-east currents which almost invariably prevail in it; and every exertion should be made to cross the equator, as soon as possible, for by so doing the ship will find much less current, and the winds will be generally more from the southward. Many navigators have remarked, that on standing to the westward, between Prince's and St. Thomas's, even when making a trifle of northing, the north-east current has been found to diminish in strength as the vessel makes westing. Even as far to the southward as 3° S. there is very seldom any easting in the wind until passing the meridian 5° W. But the vessel will find a westerly set before reaching the meridian of Greenwich; and this set is carried by the Equatorial Current, which, running in a N.W. and W.N.W. direction from the South Atlantic Ocean, sets with considerable velocity to the westward, in the neighbourhood of the equator, until it strikes upon the shores of Guayana, where its influence being considerably strengthened by the E.N.E. trade-wind, it raises the level of the Mexican sea, and finds an outlet through the Strait of Florida, where, being opposed by the coast of Carolina, the banks of the American Continent, and perhaps by a stream of current, which is well known to set out of the Greenland seas to the south-east, it

assumes a more easterly direction, until its force is gradually expended, but very little to the westward of the Azores.

From what I have just said, it will at once appear evident that the voyage of the mariner will be accelerated or retarded, according as his ship may be situated in one or the other of these currents, and that to a mean extent of about 30 to 36 miles a day. Fernando Po is famous for the finest yams, and perhaps the purest water in the world. Prince's Island possesses a very superior description of coffee; and St. Thomas is a very elevated island, which possesses excellent coffee and fruit. Anno Bon possesses abundance of stock, which can be best procured in exchange for old cast-off clothing or slops.

The homeward passage from Africa may be made in two different tracks.—the one may be called the precarious, and the other the certain track. The precarious track is to run along the coast, and on giving Cape Palmas a berth of about 100 miles, steer to the N.W., towards the Cape de Verd Islands. This track, owing to the prevalent calms, can only be pursued with advantage when the sun has northern declination; and then the mariner must be particularly careful he does not fall to the eastward of Cape Palmas, or into the Guinea Current, against which he will find it a very hard matter to work to windward. The certain route, at all times of the year, is to get into the Equatorial Current as soon as possible, and, aided by its powerful influence, you will find the ship gain very fast to the westward; and I think it advisable to cross the equator in from 20° to 21° W., near which meridian a current is very generally found setting to the northward, and from this position the homeward navigation is generally well understood.

Southerly and south-west winds are generally most prevalent between the trades, and these winds are strongest between May and August inclusive. In July, particularly, these winds blow in excessively violent squalls, and the heavy short sea which they occasion, added to the almost ceaseless rain which falls in these parallels, renders the navigation in this track peculiarly annoying and unpleasant. On the 17th December, 1836, when in latitude $9^{\circ} 31'$ N., and longitude $24^{\circ} 18'$ W., about 326 miles due south of Fogo, when in the brig *Caledonia*, of Glasgow, I fell in with a very extraordinary kind of weed, and which I never but in one solitary instance ever before heard of. The instance I allude to was noticed by the talented Humboldt, who fell in with similar weed, in the channel between Clara and Allegranza. The weed was of a brownish green, with thick, friable, circular leaves, indented at the edges, with stems about three inches long. The weed appeared tolerably fresh, with a gelatinous substance, and very minute barnacles adhering to it. Humboldt brought similar weed from the bottom, in a depth of 30 fathoms; but when I fell in with this weed, I found no bottom at 80 fathoms, and there was no perceptible current."—*Nautical Magazine* for 1843.

EQUATOR TO THE CAPE OF GOOD HOPE.

From Round Corner Point to Fanaes Islet the coast runs to the S.S.W. $\frac{1}{4}$ W., 13 leagues, and is safe and clean. The islet is small and stands near the shore. From hence to the River Nazareth, the distance is 16 miles S.W. by W. $\frac{1}{4}$ W., the coast maintaining the same general character. The west

point of the river is low and sandy, and is distinguished by a small native town, named Fetishe. Cape Lopez bears from Fetishe W.N.W. $17\frac{1}{2}$ miles, and the intermediate coast is low and sandy, and covered with trees and bushes. Shoals also extend from it about 5 or 6 miles off.

CAPE LOPEZ is low drowned land, and at first appears all rugged with bushes, which seem to stand in the water; it is steep on the sea-side, free from flats and reefs, and may be approached sufficiently near. The inner coast trends to the S.S.E. 4 leagues, and forms a river, having its entrance about 7 leagues to the southward of the cape. A spit of 2 to 3 fathoms extends to the N.E., about 5 miles from the inner part of Cape Lopez; and in a bay within this are 20 to 12 and 9 fathoms, affording anchorage in 8 to 10 fathoms. The spit must be carefully avoided in coming from the northward to Cape Lopez, as it is not noticed until you approach very near it, for you may have 10 or 12 fathoms a league and a half to the N.E. of the cape, and with the next cast find yourself aground. When you are sailing from the River Bento or Cape St. John, to Cape Lopez, always observe which way the *travado* drives the water; and should you lie at anchor when it arises, you must weigh immediately, and get off; if it be in the morning, with a south-west or south wind, keep to seaward till noon, then stand again toward the shore with a sea-wind; but if the wind does not alter at noon, tack about for all that, and go to the shore, there to anchor in oozy, and sometimes sandy ground.

THE RIVER MEXIAS is distant about 7 leagues to the southward of Cape Lopez, and has anchorage off the entrance in 5 and 4 fathoms; but there is a reef that stretches half-way across the channel from the south point. The coast between this river and Cape Lopez is very clear, and may safely be approached in 7 to 5 fathoms; it is of a similar description to the southward to the River Fernan Vas, which is distant 7 leagues. Two miles from the latter is Cape St. Catherine, known on advancing from the northward by a tuft of trees, apparently separating it from the main land; but the coast appears craggy when you approach it from the southward. The River Camma lies 3 miles to the northward of the cape, and has a depth of 6 fathoms in the entrance, but from its south extremity to the point there is a continued reef of rocks and sand.

The coast to the southward of Cape Lopez, as far as the River Sette, which is distant about $13\frac{1}{2}$ leagues from St. Catherine's Point, is in general low and clean, having a sandy beach, covered with trees, but with no particular marks to distinguish it; there is a bank of soundings of 35 to 40 fathoms, at the distance of 10 leagues to the westward of it. In fine weather the winds usually blow from the S.W., and set in after noon, with land-breezes from the N.E. in the morning. During the rains and winter months they are frequently from the southward, and at these seasons there is scarcely any land-breeze: the current often runs with much rapidity.

THE RIVER SETTE is the northern boundary of the Loango dominions. The land on each side is low, covered with high trees, and is not readily seen; the entrance has 3 fathoms, but, owing to a bar, is not navigable for large vessels. The town is of some importance, and stands about 20 leagues up the river. Point Piedras, or Rocky Point, is distant about 8 leagues, S.S.E. (S.E. $\frac{3}{4}$ E.) from the River Sette; it is surrounded, as its name implies, by a stony reef. About 4 leagues to the northward of the point lie two high mountains, flat at the top, named the Hills of the Holy Spirit. The coast hereabout is rocky, and should not be approached in less than 8 or 9 fathoms. There is great fishing on all this coast, chiefly for pargos or rocket-fish.

CAPE YUMBA lies about 50 miles to the south-eastward of Point Piedras, and appears in high hills along the shore, named the high land of Yumba; it is steep towards the sea, to the pitch of the cape, on which are some tufts of trees, from which a stony reef stretches about a mile to the S.W. Point Matooti is distant $3\frac{1}{4}$ leagues to the southward of Cape Yumba, and has a ledge of rocks, some above water, extending $1\frac{1}{4}$ mile to the northward, near to which, on the west side, is anchorage in 12 fathoms.

THE BAY OF YUMBA is about 3 leagues wide, and $1\frac{1}{4}$ deep, having good anchorage in 4 to 7 fathoms. The land to the southward of the bay is more elevated; it is covered with trees, and has a sandy beach. Banda Point lies at a distance of 35 miles to the southward of Matooti, and is surrounded by foul ground of rocks and coral. In case of necessity a vessel may anchor about a league and a half to the N.W. of the point. Kilongo Reef is distant 9 leagues, and is about half a mile in extent; there is a cove to the northward, which affords pretty safe anchorage in 5 fathoms. S.E. by S. (S.E. by E.) 8 leagues from Kilongo Cove, is the River Quiloo; the land between is tolerably even, having some hillocks and lofty trees farther in, which terminate at a tolerably high mountain, named Salomba. About 4 leagues to the southward of the cove, the land appears white at a distance, intermixed with sandy down and palm trees; the bottom along shore is sand and stone, so that you ought not to approach the coast in less than 9 fathoms, and this should be observed until you reach the river: this may be recognised by the paps—two small elevations covered with wood, on the north side.

LOANGO BAY.—This bay is distant 12 leagues S.S.E. $\frac{1}{4}$ E. (S.E. $\frac{1}{4}$ E.) from Kilongo Point; it is about 4 leagues wide, and the road is good and well secured. You anchor with a clump of trees, named Looboo Wood, bearing nearly S.E., in 6 to 4 fathoms. A reef of stones, named the Indian Bar, on which the sea breaks, stretches about a league from the south point, and must be carefully avoided. The Red Hills surround Loango Bay, and extend to the northward of it, towards Quiloo River; they are steep on the shore with bushes and palm-trees; they are marked with ravines and fissures, and resemble dirty chalk cliffs, gradually declining to a low land in the centre of the bay. There is a bay, about 2 leagues wide, between the south point of Loango and Black Point, having a good sheltered roadstead within it of 4 to 6 fathoms.

Commander Matson observes, "Loango Bay is known by a remarkable wood to the southward, or by the red cliffs to the northward. Great care is requisite in approaching this bay from the southward, as there is a shoal off the S.W. point, with only 2 fathoms on it. To enter the bay you should bring the factory houses to bear S.E.; then run in until you shoal your water, which you do almost imperceptibly, and anchor at any convenient distance. The fresh water here is very good, as it filters through the rocky mountains. The most convenient anchorage for watering in is with the south point bearing S.W. by W, $\frac{1}{4}$ W., and a clump of trees on the hill S.E. by E. $\frac{1}{4}$ E., in 3 fathoms. But I would not recommend a vessel to approach quite so close, without having previously sounded the bay. Stock of all kinds can be procured on reasonable terms."

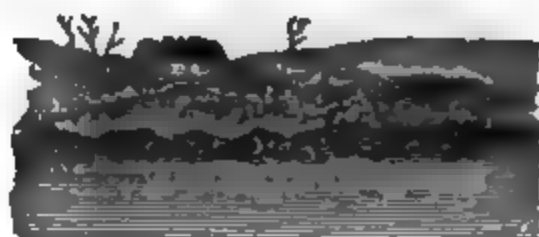
Captain Mundy observes of Loango Bay in 1843:—"The bay is formed by a projecting promontory, named Indian Point. The factories (English and American storehouses), which are situated about a mile from the beach, on the high ground, are not perceptible till you are near the shore, where the national flags are usually hoisted, and by communicating with them you may obtain intelligence. The natives are cunning and skilful traders, and opportunity offering not averse to thieving. They are otherwise inoffensive. The

baskets of this district are very curious, and are remarkable for their solidity, and they may be had in exchange for empty bottles or old clothes.

The towns or villages being some distance inland, provisions cannot be obtained in any quantity unless the vessel remains 24 hours, after which the people come down with fowls, pigs, goats, and vegetables, plaintains, and pumpkins; all of which are reasonable, and obtained by barter or money. Dollars are the coins most known.

Water may be had from the mouth of a river close at hand, but to procure this necessary article vessels should proceed to Black Point Bay, a few miles to the southward of Indian Point, a secure and better anchorage than Loango, though comparatively unknown. The country here is very beautiful, and as you stand in towards the land, between Indian and Black Point, will remind you of many parts of England, being moderately high, apparently fertile and well cultivated, with hill and dale, and a succession of downs on which at intervals are dotted a variety of picturesque woods. The character of the whole scenery is so much that of ornamental grounds, kept constantly in order by the hand of civilised man, that you can hardly believe in the reality of its being the resting place of a race of negroes, from time immemorial, in a state of barbarism, and whose communication with white men has been limited and uncertain.

On approaching the land from the seaward you will observe, apart from the other trees which crown the heights, clumps of thick brushwood, named Looboo Wood. When this bears E.N.E. (compass) you may steer direct in, and will be clear of the north-west end of the shoal, which extends between 2 and 8 miles off Black Point, and the water will shoal gradually from 17 to 9 fathoms.



Black Point, in lat. $4^{\circ} 49' S.$, long. $11^{\circ} 46' E.$, is long and low, with a dense mass of trees standing out abruptly into the sea, and terminating in a sandy spit. To the southward a few miles is False Black Point, very similar in appearance, and this makes it necessary to get hold of Looboo Wood, in order to know the ship's position.

Having stood in E.N.E., till False Black Point is shut out, you may haul to the southward for the anchorage, going by the lead. You will find soundings regular, and may anchor in 7 or 6 fathoms.

The best anchorage is Black Point S.W. $\frac{1}{2}$ S., Indian Point N. $\frac{1}{2}$ W., Iris Beacon S.E. $\frac{1}{2}$ S., good bottom, being one mile off shore; generally a ground swell. The landing at the creek is good and smooth, and water may be obtained close at hand from a spring, but only in small quantities, as the boats cannot approach owing to the shallowness of the creek, and it must be carried in breakers and started. By this means I procured about a ton an hour.

In the course of the day the Mafooka of the district, Domingo McCoy, informed Mr. Wood (the master), of the existence of a large basin of spring-water, about 2 miles from the creek, and near the beach. On examination, I found the water excellent, only 40 yards from the beach, and by cutting a road through the brushwood it was easy of access; indeed this large reservoir

may be considered as the best station on the whole line of coast for vessels to water from. The boats can approach within a few fathoms of the shore, which, abreast of this spring is steep, and in ordinary times when the swell is not great the ride easy at the grapnell, whilst the Kroumen carry the breakers in, and so start them into the puncheons.

In two days the frigate, by this means, completed to her storeage of 80 tons, and the position being hitherto unknown, I erected a beacon with the name of the ship and date of discovery, and received a promise from the Mafooka that it should be protected.

The basin bore S.E. $\frac{1}{4}$ S. from the anchorage of the Iris, distant 1 mile and a half. The water was purer than that of the Congo, and I should recommend vessels to go there in preference to the river. We rode out a violent tornado from the eastward, which lasted three hours.

Stock here was cheap, one good sized fowl for an empty bottle; feathers and beads good also for traffic; useful meats may be procured here. The Village on Black Point is neat, and the whole country a round fertile; women may be seen working in the fields. The bay was formerly much frequented by the slave vessels, but during this year very few had appeared on the coast, and Domingo (the Mafooka), an active agent of the King of Loango, for the disposal of his subjects, complained bitterly of the stagnation of the trade.

I understood that copper ore had been discovered in the mountains, and that the people were beginning to pay some attention to the cultivation of the soil. It certainly appeared to me that the whole of this district was more adapted than any part of West Africa that I had yet visited, for the European colonist, and I should strongly recommend the philanthropist and the anti-slave societies to turn their attention to this spot. The natives are harmless but crafty, and their only idea of religion is in the worship of their wooden fetiches, or carved images of the human figure.

The country between Black Point and Chilongo Bay, the northern extreme of which may be known by a reddish ledge of rocks, is quite different in character to the Loango territory, being lower and less woody, and the land being undulatory and gradually rising into the interior, the prospect is more extensive. The land is said to be fertile, and water may be had from Chilongo River. From Chilongo to Cabenda, steep and red cliffs are remarked close upon the beach, the country around and towards the interior being covered with verdure, and quite parkish in appearance.

The small and secure bay of Malemba is formed by a tongue of land of even surface, covered with grass extending into the sea in a north-westerly direction from high and perpendicular cliffs. The bay is snug for boats. The natives are addicted to thieving, and on one occasion attacked the boat of one of the brigs of war for the sake of plunder. From this to Cabenda the country continues high and fertile, and you may stand along-shore a few miles distant without fear, till you approach the anchorage of Cabenda."

The entrance of the River Loango bears S. by E. $\frac{1}{4}$ E. (S.E. $\frac{1}{4}$ S.) 17 miles from Black Point; the coast between is covered with trees, and has a sandy beach, but is not so elevated as that to the northward. Ten miles farther is the River Kaongo, in which space the land rises into hills of moderate height. Three and a half leagues S. of Kaongo is Malemba, an open bay, surrounded with red hills, moderately high, but steep towards the beach. There is anchorage here in 6 or 5 fathoms, about a league from the east shore. The marks for the road are a small hillock which borders the shore, and a little rocky point extending into the sea, near which there is a *ledge of rocks under water*

CABENDA BAY.—Point Palma, or Cabenda Hook, lies about $8\frac{1}{2}$ leagues from Malemba, and forms a well sheltered bay; to enter which steer towards a great tree at the bottom of the bay, bringing it to bear S.E. by S.; by this you will avoid, and leave on the starboard side, the sand banks at the entrance of the River Belé, which are very dangerous, having breakers occasionally on them. Take care also to give a berth to Cabenda Hook, as it is bordered with shelves that stretch a mile to seaward. The anchorage is in 5 or 4 fathoms, with the hook bearing W. and W. by S., and the tree S.E. by S., distant 2 miles. Cabenda is sometimes named Two Hills Bay, from two hills that lie to the southward of it, and which may be descried at a distance as you approach it on the north.

Commander Matson says, “Cabenda is the most notorious slave-trading place on this part of the coast; all slaves collected in the River Congo and neighbourhood are sent here for exportation. There is a dangerous shoal about $4\frac{1}{2}$ miles, N. by E. $\frac{1}{2}$ E., from the town of Porto Rico, on which the sea sometimes breaks; it is not noticed in the Admiralty Charts, or Books of Directions. There is also another shoal to the southward and westward of Cabenda Point. In approaching Cabenda from the northward you should not haul in for the bay until Porto Rico (a conspicuous town on the hill) bears to the eastward of South, and when approaching from the southward not until Cabenda Point bears S.E. These two bearings will lead you clear of the shoals, and you may thus approach Cabenda Point, and anchor at any convenient distance. If desirous of entering the bay, or inner anchorage, you should bring Cabenda Point to bear S.S.E. or S.E. by S., then steer directly for it until you shoal your water to 3 fathoms; you will then be on the south side of the entrance, which is very narrow; you may then steer along the south shore into the bay, giving Cabenda Point a berth of three-quarters of a mile. The best berth in the inner anchorage is with the western factory S W., Porto Rico S. by W., and the extreme point W. $\frac{1}{4}$ N., in $3\frac{1}{2}$ fathoms; there is also good anchorage in the entrance of the channel, in $4\frac{1}{2}$ fathoms, with Porto Rico bearing S. by E. and Red Point S.W. $\frac{1}{2}$ W. In the offing you may anchor at any distance, and in 35 fathoms, out of sight of land.

To cross the stream of the River Congo from the northward, it is requisite either to go 200 miles off shore, or to keep in anchoring ground; I always choose the latter. If you are not certain of getting across the stream before the sea-breeze dies away, anchor at the Mona Mazea Bank in 6 or 7 fathoms, until the following day, when a two hours' sea-breeze will take you to the southward of Shark's Point, and you are then out of the influence of the stream, which always runs to the N.N.W.”

• **RIVER ZAIRE, OR CONGO.**—Red Point is distant 4 leagues from Cabenda Hook, and has a reef around it that stretches $1\frac{1}{2}$ mile into the sea. From this point to that of Palmeirinho, at the entrance of the River Congo, the bearing and distance is S. by E. $\frac{1}{2}$ E. (S.E. $\frac{1}{2}$ S.) $7\frac{1}{2}$ leagues. Cape Padron is the westernmost point on the south side of the entrance. Farther to the eastward is an obtuse projection, named Turtle Corner; and 6 miles E.N.E. $\frac{1}{2}$ E. (N. E. $\frac{1}{2}$ E.) from the cape is Shark Point, known by its thickly wooded hillocks; the land then bends to the S.W. to a shoal bay, named Diego's Bay, and the coast afterwards takes an easterly direction. Between Shark's Point and Boolambemba, or Fathomless Point, the river is $2\frac{1}{2}$ leagues wide, and they bear from each other about E. by S. and W. by N.: near the coast, on each side, are 5 to 7 fathoms, but in mid-channel there is no bottom to be found at 100 fathoms.

The River Congo forms a most impetuous current at its mouth; and in

order to avoid its influence, when coming from the south for Cabenda, you should give the shore a berth of $1\frac{1}{2}$ or 2 leagues in 10 fathoms. If you happen to be on the south side of the current, and night coming on, anchor to the S.W. of Cape Padron, about 2 leagues off the coast, and wait till the breeze shall be formed next day, as it would be hazardous to attempt the passage at night. The breeze commonly begins at 9 or 10 o'clock, and blows from S.S.W. to W.S.W. You direct the head of the ship from E.N.E. to N.E., to encounter the current in the most advantageous manner, and keep it so, till you begin to be in the bed or channel of the river, when you put the head to N.N.E., constantly using the lead in the mean time. The water runs with such force, that it will often carry the lead away, and it would be vain to attempt to moor, if you were caught there in a calm. Having past the current, you will find from 16 to 14 fathoms; you must then approach the land to within 8 to 6 fathoms, but get no nearer, as there are some sand-banks of only 15 or 16 feet water, which are to be avoided. As Cabenda Hills come in view, steer N.E. towards them, but do not get into less shallow ground, for the reasons already stated.

“When the sea-breeze is not sufficiently strong to enable you to stem the current, you may steal round Shark's Point, by keeping as close as possible to the point (within 20 yards). At half-flood the current slackens, and an eddy sometimes runs up close to the shore.

In the stream of the Congo, unless with a commanding breeze, a vessel becomes quite unmanageable, owing to the strength of the superficial or upper current, and will not answer her helm unless going 5 or 6 knots. If, when endeavouring to enter the Congo, you are driven over to the Mona Mazea Bank, anchor instantly you gain soundings, or you may be driven on shore. On the left bank of the river, about 5 or 6 miles below Scotchman's Head, is a shoal not laid down in Captain Owen's chart: every man-of-war that has attempted to enter thus far has struck on it. The lead gives you no warning, as the water suddenly shoals from 7 to 2 fathoms.”—*Commander Matson*.

The coast to the southward of the River Congo is known by its red cliffs, and the current generally sets towards them; the land within is flat, the shore clean, and you can safely anchor in 8 or 10 fathoms. Seven leagues from Cape Padron is Cape Engamas; and S. by E. $\frac{1}{4}$ E., 3 leagues from the latter, is Margate Bluff. Here the coast rises considerably, and continues so for 10 leagues to Funta Bay. Its north point has a reef that stretches 3 miles to the southward; the bay is about 4 miles wide, situated at the mouth of the River Lelunda, and affords good anchorage in 4 to 6 fathoms. To the south of Funta the land is low as far as the River Cousa, which is distant about 4 leagues, and may be known by the high trees at its north point. The coast is now well wooded, with a range of double land behind. Foreland Bluff is distant 5 miles from the River Cousa, and 6 leagues farther is a point, named Double-headed Cliff, behind which, on an elevated spot, some distance inland, is a high pillar of granite, that may serve as a good mark for this part of the coast.

AMBRIZ BAY.—The River Doce is distant about 4 miles to the north of Point Palma, which is the north extremity of Ambriz Bay, distant about 5 leagues from Double-headed Cliff. Palma may be known by a mount named Aravat, standing to the N.E. of it; the south extremity of the bay is also distinguished by its close green wood, and, from the impetuous breaking of the sea, is named Strong-tide Corner. Both points are foul, being encompassed by strong reefs, on which the sea breaks. Ambriz Bay may be known by a thick green wood, close to the water, about a mile to the northward of

the town; or at a greater distance by a high piece of saddle-land immediately behind it. In running towards the bay from the northward, you may approach the coast in 8 or 7 fathoms; the anchorage is in $8\frac{1}{2}$ or 4 fathoms, towards the north side, muddy bottom, distant about 2 miles from the factory houses, and here a good supply of wood and water may be obtained, or, you may anchor with better advantage in 6 or 7 fathoms with the bluff cliff or south point bearing S.E. by S.

Nine miles S. $\frac{1}{2}$ E. (S.S.E. $\frac{1}{2}$ E.) from Strong-tide Corner is Bamba Mount, appearing like an island, to the south of which is the roadstead of Little Mazula, where you may anchor in 6 or 7 fathoms. Six leagues farther South (S.S.E.) is Mazula Bay, into which falls the River Onzo, running from the N.E.: off the mouth of this river is anchorage in 4 fathoms. The land between the two roads is rendered remarkable by the seven hills, which appear like islands standing close together on the sea-side. We now reach the River Dande, where there is anchorage in 6 to 8 fathoms. Dande Point, on the south side of the entrance, is a high steep land, flat and barren, that comes down with a tail; within it mangroves will be seen, but towards the shore there are only red and white steep cliffs. At the mouth of the river you anchor in 8 or 6 fathoms, and all along the coast in 10 and 12, soft mud. The river is described as navigable for vessels drawing 12 feet, to some distance past the town, a place which has been the seat of an extensive trade with Brazil and the islands. The coast, 4 leagues to the southward of Dande Point, is clifty, and for 2 leagues farther to Bengo River it is a low beach. Cape Lagostas, lying about 7 miles westward of the river forms the S.W. point of Bengo Bay; it is a high steep cliff, surmounted by trees which cover its summit; the land between it and the river is low, but rises towards the cape in white and red cliffs, forming a contrast with the low land that appears within to the south-eastward, when you approach from the N.W.

ST. PAUL DE LOANDO.—This is a city of considerable extent, situated on the south shore of Bengo Bay, and it is the chief settlement of the Portuguese on the coast of Angola, and the best place for a ship to obtain refreshments. The port is formed by a low narrow sandy island, $6\frac{1}{2}$ miles in length from N.E. to S.W., and forms a bay with the coast where the town is situated, about $1\frac{1}{2}$ mile broad, but so shallow that some parts dry at low water. About half a league S.W. of Cape Lagostas stands the cenotaph and fort of San Pedro; and about $4\frac{1}{2}$ miles to the south-westward, on the west of the town, is the citadel of Fort San Miguel; about half a league from the latter, the depths in the harbour are 17, 16, and 12 fathoms, whence they suddenly shoalen to 2, and in some places only 1 fathom. The island of Loando is so low that it will not be perceived, though the land behind it may be distinctly seen. From its north end there is a hard sandy reef, about one mile broad, that extends 2 miles E.N.E. (N.E.) having in some parts only 12 feet water upon it. Cape Lagostas bearing S.E. by E. will lead clear of its north end, in 17 or 18 fathoms; and Bengo Point brought a little open to the left of the cape, leads nearly a mile to the N.E. of the reef, and to the opening of the harbour.*

On advancing from the northward for St. Paul de Loando, you may approach within half a mile of Cape Lagostas, on a south bearing; then steer

* I found the meridian distance between the N. end of Loando Island and the time office of St Helena to be 1h. 15m. 30sec., and between the former place and Benguela Fort 42 sec. The trees on Loando Island, just open to the westward of Fort San Miguel, lead you clear of the outside edge of the shoal; you may also anchor on this bearing close to Loando Island, but it is indifferent holding ground. Good oranges may be procured here cheap."—Commander Matson, R.N., 1844.

towards mid-channel to the W.S.W., for the fort of San Miguel, keeping it a sail's breadth open to the southward of the north-eastern end of Loando Island, and having got abreast of Fort St. Francisco, on the east of the town, anchor in 10 or 12 fathoms, good holding ground. Vessels should not venture to pass beyond this fort, as the water shoalens very quickly above it. Coming from the southward, keep well to the north of Loando Island, until you open on a S.S.E. bearing, the bluff point in Bengo Bay, within Cape Lagostas, which you may then steer for, rounding the reef, and proceeding for the anchorage as before directed.

Curimba Cove lies at the south end of Loando Island, and is defended by a fort, within which there is an extensive lagoon, divided from the sea by a narrow neck of land. About 5 leagues to the S.W. of Curimba there is a sandy point, named Palmarinho, from which a sandy reef stretches off nearly 2 miles; to the southward of it lies Sleepers' Bay, and beyond that is the River Coanzo, having an entrance half a league wide. This river is the southern boundary of Angola, and abreast of it you may anchor in 12 or 14 fathoms, 3 leagues from shore, or in 9 fathoms within a league of it. Only small vessels can cross the bar of this river, and that at high water when the sea is smooth; during a swell the sea breaks violently across the entrance. In Sleepers' Bay there is anchorage in 6 to 9 fathoms, oozy ground, the marks for which is a grove of trees in the middle of it, along the side, and to the northward two hummocks appearing like paps.

Cape Ledo bears S. by W. $\frac{1}{4}$ W. (S. $\frac{1}{4}$ E.) 10 leagues from the entrance of Coanzo; it is a high rugged promontory, with straggling trees projecting into the sea. About 4 leagues to the northward of it, the coast chiefly appears all steep hills and verdant land; on the south side it is bordered by remarkable white cliffs. About 5 leagues S $\frac{1}{4}$ W. (S. by E. $\frac{1}{4}$ E.) from Cape Ledo is Cape St. Bras; and 11 leagues to the south of the latter is Point Longo, at some distance to the south of which is a river of the same name, which is the general rendezvous for slavers from Benguela and St. Paul de Loando, from which places the slaves are marched overland; there are no inhabitants, but wild animals are seen in great abundance. About 5 leagues to the southward of the River Longo is the Bight of Old Benguela, about 2 leagues wide, from the end of the cliffs to a projection named the Three Points, at the mouth of the River Cuba. Point Morro is distant about 5 leagues from the Three Points, and is a steep, black, rugged, stony point, and forms the north extremity of Bahia Longa, which lies between that point and Point Longo, 15 leagues to the south. Novo Redondo is situated in Bahia Longa, distant about 10 leagues from Morro Point. There is anchorage here, near the shore, in 2 or 3 fathoms; and the settlement, which has been established by the Portuguese, is defended by a fort.

Seven leagues from Novo Redondo is Whale's Head, or Muddy Point, and beyond that is a projection named Green Point. We next arrive at the small cove of Cotovelo, which affords well sheltered anchorage in 3 fathoms, muddy bottom, having 7 fathoms in the entrance. Three leagues S.W. of Cotovelo is the River Cuvo, the northern boundary of Benguela; the north point of the river is known by a white cliff that looks like a fort, and to the S.E. of it is a remarkable sugar-loaf, 6 or 7 leagues inland. The River Catumbela is distant 5 leagues S.W. $\frac{1}{4}$ W. from the north point of Cuvo, and has anchorage before it, in 7, 6, 5, and 3 fathoms.

ST. PHILIP DE BENGUELA.—This place is next in importance to that of St. Paul de Loando. About 4 miles to the S.W. of the River Catumbela is the N.E. point of Bahia das Vacas, or Cows' Bay, at the bottom of which stands *the town of St. Philip*. The point has a spit of sand under water, that runs

about three-quarters of a mile north into the sea. Benguela Bay is formed by a peninsula on the S.W. side, the extremity of which is named Point de Chapeo, from a remarkable single clump of trees, named St. Philip's Bonnet. The two points of the bay extend from each other 7 or 8 miles, and it is about $2\frac{1}{2}$ miles in depth. Midway between the two points are 17 fathoms, the depth of water gradually decreasing towards the shore, about three-quarters of a mile from which are 6 fathoms. The water here is neither good nor easily procured, but all articles of provisions are plentiful, and abundance of fine fish may be caught in the bay.

H. M.S. Nereus lay in 10 fathoms, with the flagstaff in a line with the east side of the church, and this is considered the best anchorage. Another vessel moored in 10 fathoms, with the northern extreme of the land N. by W. $\frac{1}{4}$ W., St. Philip's Bonnet W.N.W. $\frac{1}{4}$ W., the flagstaff of the fort S.E. $\frac{1}{4}$ E., about $1\frac{1}{2}$ mile from the shore: several vessels at the time were riding within in the road.

At about $9\frac{1}{2}$ leagues from St. Philip's Bonnet is Salinas Point, which extends $1\frac{1}{2}$ league to seaward, beyond the land to the southward, and has a reef about it. Commander Matson says, "Salinas Point is a piece of low flat sandy land, extending 5 or 6 miles beyond the high land, and has a remarkable tree at its extreme point. There is a reef to the southward of it, and the water between it and Luash is shoal; but to the northward of the point the shore is very bold, there being 10 fathoms within a cable's length of the beach. It is, however, dangerous to approach it during the night, for the beach being of white sand, and projecting so far from the high land behind it, renders it difficult to be seen until very close. Many vessels have run on this beach in a fine clear night.

The coast between Salinas and St. Philip's Bonnet does not appear to have been surveyed by Captain Owen, or so imperfectly as to mislead strangers. The Sailing Directory gives the course from Salinas to St. Philip's Bonnet, as E.N.E. $\frac{1}{4}$ E., but it is not possible to make a direct course between these two points; the land between them forming the segment of a circle. A stranger having made the high land of St. Philip's Bonnet before dark, bearing E. $\frac{1}{4}$ S. or E. $\frac{3}{4}$ S., 5 or 6 leagues, would not see the intervening low land, and would perhaps (guided by the charts and Sailing Directory) steer directly for the Bonnet; or he would consider E. to be a safe course, but even this would take his vessel on the beach (off which there is no anchorage).

When St. Philip's Bonnet bears E.S.E. you may steer directly for it, and having passed it at any convenient distance, proceed into Benguela Roads. A little to the westward of the Bonnet are several snug little coves, where boats or small craft can lie unseen. In one of these a boat belonging to the Waterwitch remained concealed for nine days, watching a slaver in Benguela Roads, which she captured on her leaving the anchorage, with 390 slaves on board.

Bahia Torta is a fine spacious bay, having good and secure anchorage; but I had not an opportunity of making a survey.

St. Philip's de Benguela is in a wretched state of dilapidation and decay; the houses, originally of mud, are now falling to pieces. There is scarcely any trade but that in slaves, and even that has been almost entirely suppressed by the British cruisers. The soil is perfectly barren, not the slightest appearance of vegetation, excepting near the River Catumbela. On leaving this anchorage, a vessel should not bring the town to bear to the westward of South until she is 4 or 5 miles distant: she will then be clear of the shoal to the northward."

At about 7 leagues S.W. $\frac{1}{4}$ W. from Salinas Point are the Friars's Rocks,

which lie off Francisco Point, and are three in number. They are 12 to 14 feet high, and will be readily observed. Between these rocks and Salinas Point is Elephant's Bay, so named from the number of those animals seen there. This bay is one of the best anchorages on this part of the coast; it is perfectly secure and sheltered from the only winds that blow, the south and south-west. It may be known at a great distance by a very high piece of table-land near the bottom of the bay, and under which is the best anchoring-ground; that near the shore is rocky in some places. The rollers, or *calema*, which occasionally set in along the whole coast, are not felt in this bay. Fish can be here procured by the seine in great abundance, and the hills abound with game and wild animals of all descriptions, which, owing to there not being any inhabitants, are remarkably tame. This is by far the best place on the coast for refitting and refreshing the ship's company after a cruise. Commander Matson has repeatedly anchored here for a few hours, merely for the sake of giving the men a run on shore, to wash their clothes, to bathe, and haul the seine, as it is the only place on the coast where this can be done with impunity. The climate is very salubrious, as is the whole coast to the southward of Salinas. Before anchoring in this bay to refit, it would be as well to procure a bullock or two, and some vegetables, at Little Fish Bay (lat. $15^{\circ} 13' S.$), which can be purchased there on very reasonable terms. Water can be procured in Elephant Bay, excepting during a rainy season, which sometimes does not occur once in five years: there was no rain whatever during the years 1840, 1841, 1842; but when the rains do set in, they continue incessantly for weeks together, and the country then becomes inundated. The appearance of a number of large water courses seems to corroborate this statement. Excellent oysters can be gathered from the rocks on either side of the bay.

In lat. $13^{\circ} S.$ and long $12^{\circ} 57' E.$ is a small snug harbour, named Luash, which affords excellent shelter for small vessels. It is here that the slave vessels belonging to Benguela generally embark their slaves.

The shore in the vicinity of Elephant's Bay is bold, and there is good anchorage near it in 10 or 12 fathoms. Cape St. Mary bears S.W. by W. (westerly) $5\frac{1}{2}$ leagues from the Friar's Rocks, the land between forming a bay of the same name, the shore of which is steep, and the depth of water very great.

The coast, to the southward of Cape St. Mary, is high and steep towards the River Gubero, which is distant 9 leagues; it may be known by a round hill that lies about half-way between. We next reach the River St. Nicholas, 10 leagues more to the southward, rendered dangerous by a reef on the south side of the entrance, with breakers on it. Five leagues beyond St. Nicholas is Village Bay, which is small, but the ground is good. To the southward of it, near the entrance of the River Ramos, stands a high mountain, named the Old Man, that serves as a good mark for the coast.

LITTLE FISH BAY.—Cape Euspa is the north point of this bay, and lies about 12 leagues S.W. $\frac{1}{2}$ S. from the Old Man Mountain. There are two sandy coves between, separated from each other by Cape Gertruda, named Flies' and Turtle Bays, in either of which there is anchorage. Point Annonciation, or Brown's Point, forms the south extremity of Little Fish Bay, and is distant about 2 leagues from Cape Euspa. Near it is a projecting head of sand, that extends to the N.W.; and here commences a range of hills and high cliffs, that extend 6 or 7 leagues to the entrance of the River Flamangos; and in this space stands Mount Negro, which may be seen at a considerable distance.

The bearing and distance from the south point of Little Fish Bay to Cape Negro is S.W. $\frac{1}{2}$ S. 10 leagues. This is a remarkable headland, distinguished

by a pillar of alabaster, erected thereon by the Portuguese, discernable 7 leagues distance, were it not for the atmosphere being generally hazy, owing to which circumstance it has been passed at less than half that distance without being seen.

PORT ALEXANDER.—From Cape Negro to Port Alexander the distance is S.W. $\frac{1}{2}$ S. $2\frac{1}{2}$ leagues. This is a very safe harbour, affording excellent anchorage in 16 to 12 fathoms, but towards the N.W. the harbour is shallow; it is formed by a peninsula on the north, being a low sandy tongue of land. The outer point on the east is a high sand cliff, and the coast towards Cape Negro is of a similar description. From the outer point of Port Alexander, the bearing and distance to Great Fish Bay are S. by W. $\frac{1}{2}$ W. 14 leagues.

GREAT FISH BAY.—This is a spacious and fine bay, formed by a narrow neck of land to the westward, named the Tiger Peninsula. Its entrance is to the northward, and above 2 leagues in breadth, getting still wider as you advance within it. You may round the N.W. point of the Tiger Peninsula very close, in from 18 to 12 fathoms water, clear of any danger whatever. Within the harbour are from 20 to 5 fathoms; it appears safe and well sheltered, but it is little frequented, except by whalers, on account of there being no fresh water to be procured there, although that by digging wells on the shore, this may easily be obtained. To the southward of Great Fish Bay, as far as latitude 31° S., the coast is a mere sandy desert, and said to be destitute of fresh water.

At some distance from the south point of Tiger Peninsula, the land is bordered with downs and several slender bays, for a distance of nearly 20 leagues to Nourse River: it thence takes a S.W. and southerly direction, 25 leagues, to Cape Frio, on the north of which is a cove of the same name. Although the land, some few leagues to the northward of the cape, is tolerably high, yet in its immediate vicinity the shore is low and sandy, and continues so for several leagues to the southward. From Cape Negro to Cape Frio the soundings vary from 70 to 50 fathoms water, 7 or 8 miles from the land. Frio Cove may be recognised by three hills, the middle one being higher than the other. The land from hence to the cape appears double; as you approach towards the latter, the coast is covered with trees, interspersed with numerous sand hills, and the depth of water is generally about from 15 to 20 fathoms, at 1 or 2 leagues distance. Nearly 70 leagues to the southward of Cape Frio is Cape Sierra, or Cape Cross; the coast between is very imperfectly known,—it is chiefly of a low sandy nature, rising into high land towards the interior. The depth of water near the shore varies from 10 to 15 and 20 fathoms.

WALWICH BAY is spacious, and well sheltered, except from northerly winds, which seldom prevail. There is a safe harbour in the south part of it, the entrance to which bears S. $\frac{1}{2}$ E. (S.S.E. $\frac{1}{2}$ E.) 23 leagues from Cape Sierra. Its western side forms a peninsula, 4 miles in length, terminating at the north, at Pelican Point, where its entrance is about $3\frac{1}{2}$ miles wide: the soundings round the shore regularly vary from 3 to 6 and 7 fathoms. The bay may be known by a remarkable hill to the northward of it, with several sharp peaks to the top, which incline towards the N.E. About 4 leagues to the northward of Walwich Bay is a newly discovered river, named Somerset.

Captain Morrell says, “the entrance to the bay is 1 league broad, running to the south 2 leagues, one league and a half of which is navigable, and the depth of water in going in is from 12 to 3 fathoms mud and clay bottom, near the head of the bay.

The east side of this bay is formed by moderately elevated sand-hills, near the sea shore and the west side is formed by a very low sandy peninsula, not

more than 15 feet above the level of the sea at any place. The isthmus is very narrow, it being not more than 20 rods from the head of the bay to the sea shore. The peninsula, however, is from 1 to 3 miles in width. In entering this bay, it is necessary to give the west point a good berth of nearly half a mile, on account of a sand-bank that runs off from it, in a N.N.E. direction, about a quarter of a mile, on which there is only 6 feet of water at low tide. After doubling this point, in advancing up the bay, it is proper to give the western shore a berth of one-fourth of a mile; taking care not to approach it any nearer, as the water becomes shallow very suddenly, from 5 fathoms to 2, and even to 4 feet, at low water. This is a mud bank, which stretches all along the western and southern shore of this bay; but the eastern shore is bold one cable's length from the beach, nearly to the head of the bay. About 8 miles from the S.E. part of the bay, on a S.E. by E. course, is a small village, where fresh water may be had from many springs in the valley. This water possesses a peculiar flavour not unlike sassafras tea, but it is not in the least brackish."

At about 13 leagues to the southward of Walwich Bay is Sandwich Harbour, or Port D'Ilheo, which is a small unimportant place. The outward point of the harbour stretches some distance into the sea, and is encompassed by reefs. In the harbour are said to be 3 fathoms. Captain Morrell visited it in 1828, and says, "This harbour is represented to have 3 fathoms of water in its channel of entrance. Although we found only 11 feet at high water in this channel, I have no doubt there was a time, some years back, when its depth was full 3 fathoms, and that it has been filled up by drifts of sand.

This lagoon runs into the southward, about 2 leagues, with 7, 5, 3, and 2 fathoms nearly all over it. It is formed on the east by a high white bluff sand-hill; and on the west by a low sandy peninsula nearly level with the sea, with shoal water on the starboard side for more than a mile to seaward. The entrance of the lagoon is very narrow, being not more than a quarter of a mile wide, and formed by two low sandy points, situated in latitude $23^{\circ} 35' S.$ longitude $14^{\circ} 28' E.$ "

The *Aligator Rock*, represented to lie in latitude $24^{\circ} 38' S.$ and longitude about $14^{\circ} 14' E.$, at about 6 leagues from the shore, is said to consist of a reef with breakers running to the south-eastward fully 2 leagues. Captain Morrell spent two days in searching after it, but without success, and therefore concluded that there is no such reef, but that Bird Island has been seen in a haze, and mistaken for a danger which does not actually exist. The extreme haziness of the weather peculiar to this coast might very easily have deceived Captain Wood, of his Britannic Majesty's ship *Garland*, when he thought he had discovered a reef here in 1798; for frequently when running along the coast, at not more than 1 league from the land, the sand hills appear to be 5 or 6 leagues from the vessel.

Bird Island.—In latitude about $24^{\circ} 30' S.$ is a small island at nearly 4 miles from the coast, named Hollam's Bird Island, which is not more than a quarter of a mile in extent, and has a reef of rocks extending from it in a south-westerly direction about 5 miles, causing the sea to break heavily at all times. A large number of right whales frequent this reef in the months of July and August; and a ship may lie at anchor on the north side of the island, in 10 fathoms of water, all the whaling season, in perfect safety, if she has chain cables.

SPENCER'S BAY.—In about latitude $25^{\circ} 40' S.$ is Spencer's Bay, which is sheltered to the westward by a small island, named Mercury, and a rock at its north end; yet it is more exposed than either of the bays we have al-

ready described on this desert coast. The best anchorage appears to be behind Mercury Island, in 6 or 7 fathoms. The southern shore of the bay is rocky, while a considerable surf beats continually on the sandy beach, which forms the eastern side of the bay, from these causes the bay is but little frequented. The coast hereabout is a sandy beach, having no appearance of water or vegetation; the interior exhibits high sand hills, but does not appear to be inhabited; lions and other wild animals seem numerous.

Captain Morrell says, "We anchored on the 22nd of October on the east side of Mercury Island, in 4 fathoms water, at about two cables' length from the island, which is situated in latitude $25^{\circ} 42'$ S. longitude $14^{\circ} 58'$ E. It is one mile in circumference, of an oblong shape, lying north and south, and is three-quarters of a mile north from the south-west point of Spencer's Bay, and $1\frac{1}{4}$ miles west from the north-east point of the same bay. Both passages are easy, and free from dangers; and the best anchorage is on the east side of the island, about 150 fathoms from its shores, in 5 fathoms of water, sand and clay bottom. I would not advise ships to anchor to the south side of the bay, as a heavy westerly swell heaves into it, on the full and change of the moon; but let them anchor close under the island, and they will lie perfectly safe, in smooth water. The south point of Spencer's Bay presents several high peaked rocks, nearly 600 feet perpendicular at the water's edge."

In lat. $26^{\circ} 8'$ S., is said to be an excellent bay, which is capable of affording shelter from N.E. to S.W., with good holding-ground on blue mud and sand. It is about $2\frac{1}{4}$ miles wide, and 3 miles deep.

ICHABOE ISLAND.—This island, which some time since obtained so much notoriety for its guano, lies in lat. $26^{\circ} 19'$ S. and long. $14^{\circ} 51'$ E. It is scarcely a mile in circumference, and lies about 24 miles north from Angra Pequena, being distant from the shore not more than a mile and a half. The landing-place is on the north-east part of the island; but after heavy gales, with much swell outside, there is frequently such a surf for about twenty yards from the shore as to make it difficult, and even dangerous for a boat to land.

A point of land from the continent extends 3 or 4 miles into the sea, to the south of the island; and from the extremity of this point a reef puts off in a north-west direction, until it nearly meets a reef that projects from the west side of the island. Another reef puts off from the north-east point of the island; consequently a bay is formed in which a ship might lie all the year round, in perfect safety and smooth water.

Captain Morrell says,—“In coming to this anchorage care should always be taken to pass round the north (?) end of the island, giving its north-east point a berth of half a mile, which will avoid all dangers. In working into this harbour, the shore on the main may be approached within two cables' length.

This is a fine place for making captive the great leviathan of the ocean, the *right* whale, great numbers of which strike on this part of the coast about the middle of June. They are in the habit of playing about the reefs of the island, and that which runs from the continental point before mentioned: and as the south wind prevails, there is no difficulty in getting the dead whale alongside of the ship. Scale-fish may be caught at the anchorage with hook and line; or at the bay with a seine, in great quantities. An abundance of craw-fish may also be caught with a hoop-net, all around the island, within 50 fathoms of the shore."

ANGRA PEQUENA.—At 8 leagues to the southward of Ichaboe Island is Angra Pequena Bay, a narrow inlet of the sea, running in to the eastward of a rocky promontory. Its depth is about 2 leagues, and the soundings are

6, 5, 4, 3, and 2 fathoms water, and it is well sheltered from all winds. On its eastern side is a small cove, with a sandy beach for boats to land at, if necessary; and at the southern part of the harbour is a sandy plain, the soundings lessening gradually as you approach towards it. There are three small islands to the northward of Angra Pequena, named Seal, Penguin, and Shark Islands; these are surrounded with rocks, but have passages between, and an excellent harbour within them, in which are 3 to 5 fathoms. A dangerous shoal is said to lie 11 miles from the shore of Angra Pequena.

Captain Livingston adds, "Angra Pequena lies nearly 6 leagues to the northward of Possession Island, and its south point is in latitude $26^{\circ} 39'$ S. and longitude $15^{\circ} 7'$ E. There was a marble cross upon it, erected by the Portuguese about three centuries and a half ago, and remained until some modern Vandals threw it down, not many years since. Nearly 4 miles to the eastward of Cross Point is Angra Point, half a mile from which, bearing N.E. (*true*) is a rocky reef, and between it and the point is a passage of 4 or 5 fathoms water; but it is safest for vessels to pass a good half mile to the northward of the reef, after rounding which a lagoon will open, which runs in four or five miles to the southward. The entrance of this lagoon "or bay" is $1\frac{1}{2}$ mile wide, with 7 fathoms water in the middle, gradually shallowing to the head of the lagoon, on both sides. One league up this bay are four fathoms on a muddy bottom, and at this place is the best anchorage, a quarter of a mile from the western shore

E. by N. (*true*), two miles from Angra Point, are two small islands at a mile from the mainland, and lying nearly north and south, named the Penguin Islands. Neither of them exceeds a mile in length. Inside of the southern island is good anchorage, in 5 fathoms water on a clayey bottom, about 400 fathoms from the east side of and near the middle of the island; care must, however, be taken to avoid a rock almost level with the water, and lying half a mile to the north of the passage.

A vessel may enter this harbour either to the northward or the southward of the island, but the southern passage is the preferable one, and is clear of danger at a quarter of a cable's length from either shore. There are stated to be some rocks inside of the northern island, which render the anchorage unsafe between it and the mainland. Ten or twelve miles north of Angra Pequena, at a mile or a little more from the shore, are springs of excellent fresh water, although it is generally asserted that there is no fresh water along all this coast. There are usually some Hottentot families near the springs.

A shoal lies N.N.W. (*true*), from Angra Pequena 5 leagues distant, and this is the only danger, lying more than 4 miles from the shore, as far to the northward as Spencer's Bay. Nearly half way between Possession Island and Angra Pequena, at a mile from the shore, are some rocks, with good anchorage inside of them in 5 fathoms, sandy bottom. To sail into this anchorage keep round the rocks on the starboard hand at 50 or 60 fathoms distance, and then steering to the southward, anchor opposite the middle of the reef, and half way between it and the mainland. These rocks are a resort of fur-seals, and it is likely there may be guano upon them.

It is said there is a dangerous shoal lying between three and four leagues to the west of Angra Pequena, in latitude $26^{\circ} 35'$ S.; but I can assert, with the greatest degree of confidence, that there is but one shoal on any part of this coast, south of Spencer's Bay, that lies more than four miles from the mainland; and this one lies N.N.W. from Angra Pequena, or Santa Cruz, about 15 miles."

ELIZABETH BAY—This slender bay lies about 5 leagues to the south-

ward of Angra Pequena, and is formed by a narrow semicircular island, between 2 or 3 miles distant from the main, named Possession Island, within which vessels may ride either close to the island, in 3, 4, or 5 fathoms, or midway between, in 10 or 11 fathoms, the island affording shelter from the West and S.W. At the north end of Possession Island are some rocky islets, having 11 fathoms water near them; and at the south end there is a rocky reef, with 9 fathoms at its extremity: there is a safe landing for boats on the main. Tides rise, on the full and change of the moon, in Elizabeth Bay, about 6 feet. About 22 leagues to the southward of Elizabeth Bay is Angra Juntas, or Narmaquas Bay, with an island at its entrance. The coast hereabout, or indeed all the way between, is rocky, and destitute of water and vegetation.

CAPE VOLTAS is about 22 leagues from Angra Juntas, and forms the south point of Orange, or Giarep River, the mouth of which is half a mile wide, but much encumbered with rocks, extending in an east and west direction a mile from shore. An extensive reef projects from the cape, and there are several small islands to the southward of it. On this side the coast is low and sandy, but towards the northward it is more elevated.

The coast to the southward of Cape Voltas presents an appearance of barren sandy plains, without water, until you reach the River Koussie, which forms the N.W. boundary of the Colony of the Cape. Nearly 13 leagues farther is Zwaitlinje River. Then follow the Rivers Groerne and Zwarte Darn; and about 8 leagues from the latter is the mouth of the river Oliphant, or Elephant, the entrance to which is rocky, shallow, and contracted. Donkin's Bay lies about 4 leagues to the southward of Elephant River, and 3 leagues beyond that is a small sandy cove, named Lambert's Cove.

ST. HELEN, OR HELENA BAY.—About 5 leagues south of Lambert's is a high bluff headland, named Cape Deseada; and between that and Pater-noster, or St. Martin's Point, 10 leagues to the south-eastward, is situated St. Helen's Bay. There are regular soundings in the bay, of 12 to 10 fathoms, decreasing towards the shore to 6 and 4 fathoms; but it is bordered by a reef on the western side, that extends all the way to Berg River, an inconsiderable stream falling into the bottom of the bay. The anchorage in St. Helen's Bay is safe in summer, when southerly winds are prevalent; but in winter when it blows from the North and N.W. quarters, it is not to be recommended. It is high water here, at the full and change, at half-past two o'clock. St. Martin's Point is low; a rock is said to lie 3 leagues to the southward of it, about 4 miles from the land.

SALDANHA BAY is situated about 7 leagues south of the former; the coast between is broken and rugged, indented by several small coves, and must be given a wide berth, as some rocks lie a considerable distance from it. Saldanha is a spacious, secure, and excellent harbour; its entrance is in latitude $33^{\circ} 6' S.$; there can be no difficulty in running for it, if you are assured of your proper latitude. At its mouth are the islands of Jutten and Malagen, or Malagassen; these are both low, and require a person to be placed at the mast-head to discover them; they lie nearly N.W. and S.E. of each other, and the channel between them has from 13 to 24 fathoms water. It is said there is also a passage between Jutten Island and the main, with from 7 to 11 fathoms water in it, and that both sides may be safely approached within 100 yards distance; but that you should anchor at twice that distance off, or you will have foul ground. Between Malagassen and the main there is also a channel, with from 20 to 10 fathoms, but foul and dangerous; some rocks likewise lie off the N.W. of this island. Farther in is the Island Mascus, a flat naked rock, with a passage on either side of it; this you may approach

to about a cable's length, into 6 and 7 fathoms water, but not nearer. The southern channel is the wider of the two, and preferable with a southerly wind; for if desirous of anchoring to the southward, in order to avail yourself of a south-easter, to go out, you will be able to reach your anchorage; or if you wish to run into Hoetjes Bay, you will have time enough to take in sail before you anchor.

Hoetjes Bay is that part which forms the northern part of Saldanha Bay, and affords anchorage in 6 fathoms water, with the granite pier in one with Mascus Island bearing S. by W., where you will ride land-locked, and sheltered from all winds. About a cable's length from the northern point of land which forms Hoetjes Bay, is a rock which dries at low water, spring tides. There is also another rock, named the Blinder Klip, which has only 3 feet water over it at low water, and is not visible unless the wind blows strong enough to cause a rippling: the mark for this rock is Mascus Island and the Mouse's Back (a hill on the northern shore) in one. The western shore of Hoetjes Bay is skirted by a range of rocks, having 4 fathoms water close to them; the starboard shore is bold-to in working up to the head of Saldanha Bay, until you are about $1\frac{1}{4}$ mile from Sheep Island, where a triangularly-formed bank begins and terminates at Salamander Point, the soundings over which are from 5 to 3 fathoms; the depth is regular on the starboard side, from $3\frac{1}{4}$ and 3 fathoms, till within half a mile of the beach. Near Scapen, or Sheep Island, is another small island, having shoal water off it, and the depths very irregular; about a mile off it are $2\frac{1}{4}$ fathoms, and in some parts are only 6 and 7 feet. Between this and the eastern shore, the channel continues good as far as Melvill's, or the Old Port House, up the Lagoon. In working up to Sheep's Island, you ought to keep your lead going constantly, for the soundings to the north-eastward are regular; but in standing back south-westward, endeavour to get the north end of Sheep Island in one with Saddle Hill, then put about, for the water shoals directly afterwards.

There is a place named Bavian's Bay, situated at the back of, or between Mascus Island and the main, where vessels may ride sheltered from the N.W. winds; but the ground is foul, and Hoetjes Bay will always be found more convenient, as ships may work out from that place at all times. Cattle and provisions are commonly plentiful and reasonable, and fish may be netted in abundance in Riet's Bay or Cove, or with hook and line at every other part of the bay. This is also an excellent place for repairing or even building vessels, but the greatest inconvenience attending is the want of wood and fresh water, although the latter is said to have been recently discovered.

DASSEN OR CONEY ISLAND is a low flat island, lying 7 leagues to the southward of Saldanha Bay, and 5 miles from the land; it is the resort of innumerable penguins and rabbits. Its S. and W. sides are rocky, with breakers that extend half a league into the sea; there is anchorage, however, on the east side in 16 fathoms, about a gun-shot from the shore, bottom of white sand.

ROBBEN, OR PENGUIN ISLAND, lies 24 miles S. $\frac{1}{4}$ E. (S.S.E. $\frac{1}{4}$ E.) from Dassen Island; it is low and flat, about two miles long, and one mile broad, being $3\frac{1}{4}$ miles off the main, and $4\frac{1}{4}$ miles to the northward of Green Point, and is surrounded by rocky ground. One mile distant from its southern extremity is a sunken rock, named the Whale, over which the sea breaks when there is any swell, but at other times the water flows smoothly over it.

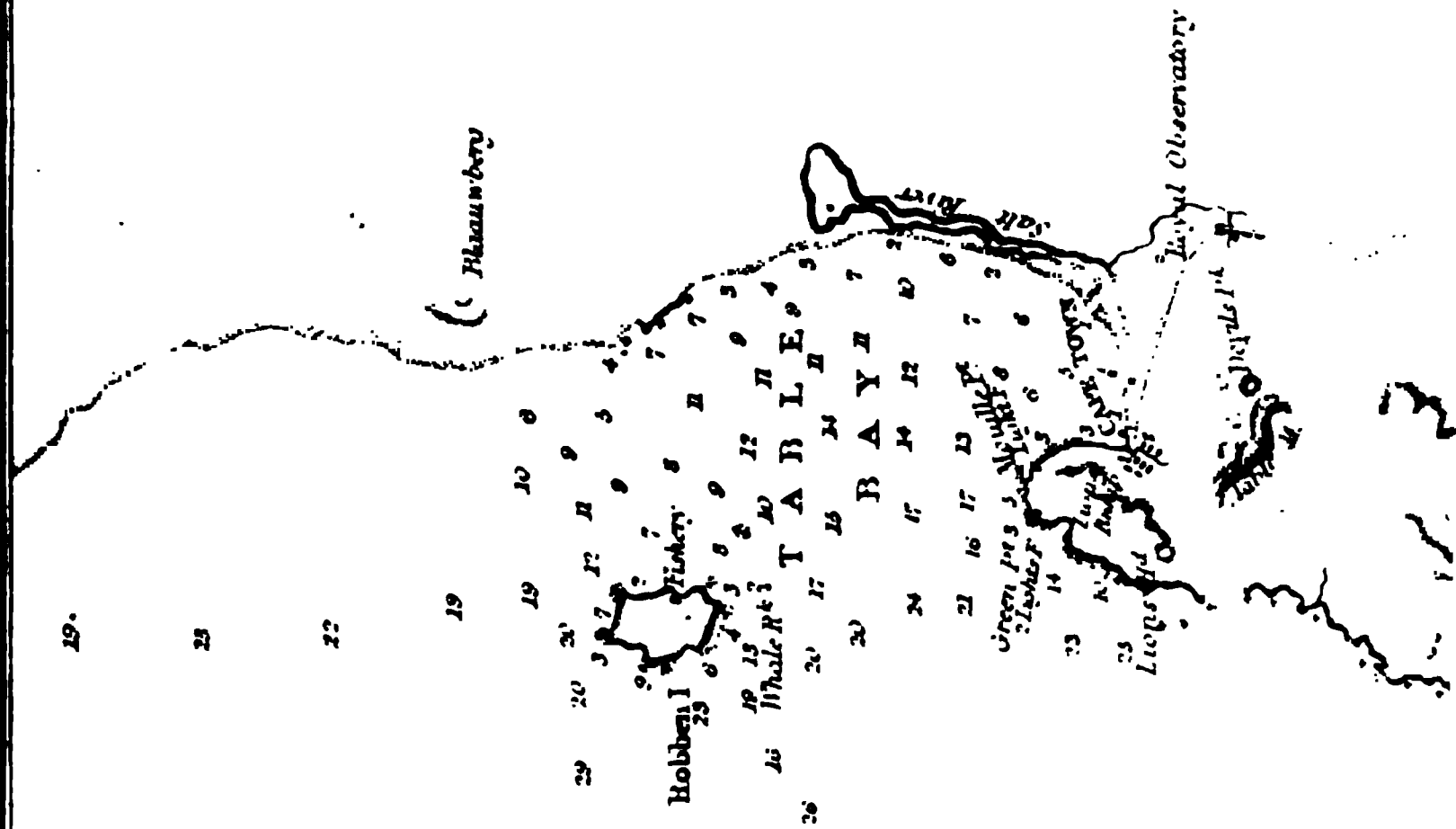
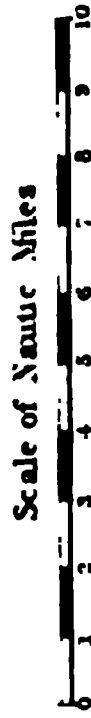
Should a ship, in making for Table Bay, be driven to the northward of *Dassen Island*, by the southern winds, the soundings will be a good and safe

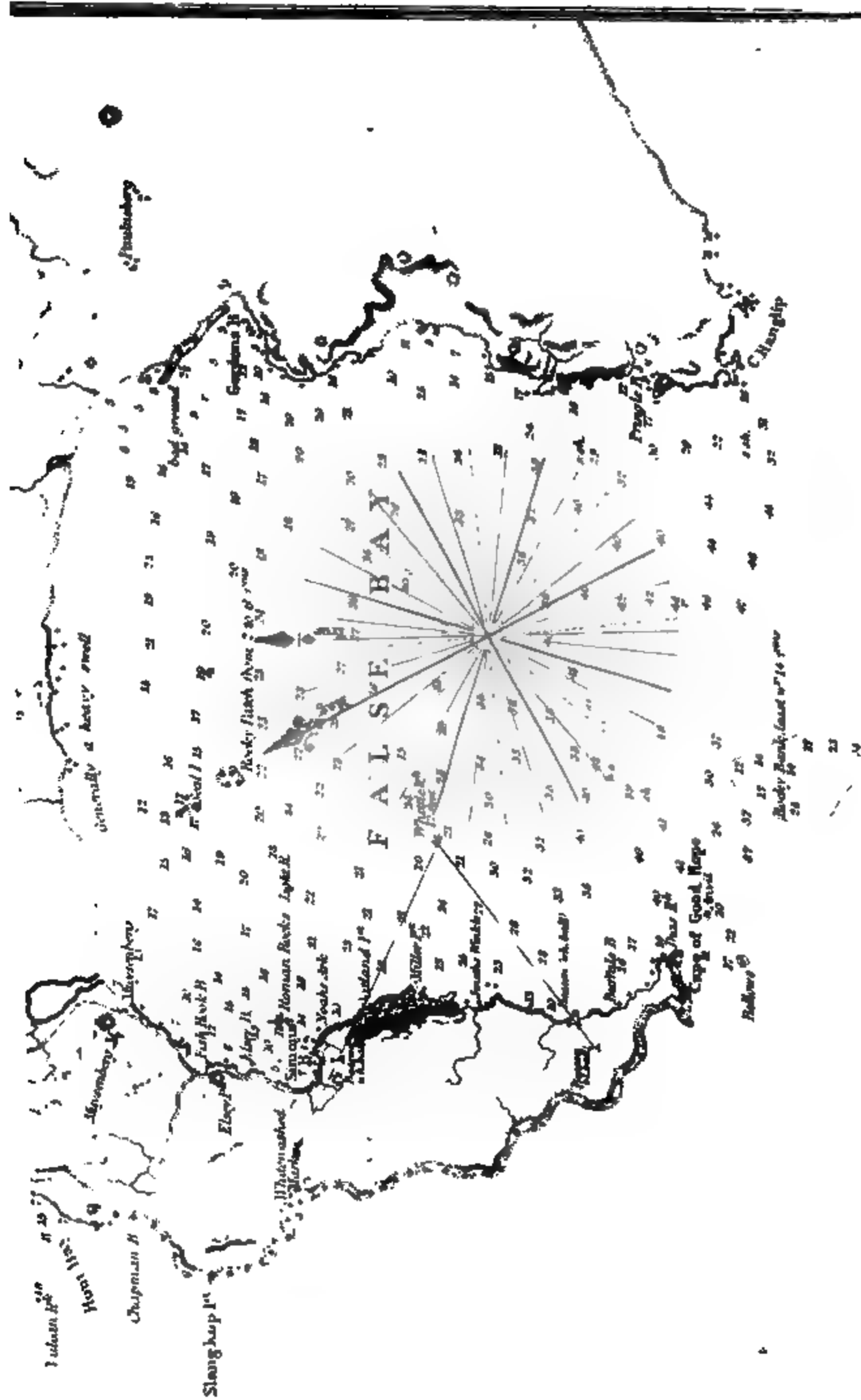
TABLET AND ESTEES. STUB BAYS.

By Louis L. E. Kidder.

Devils Peak
Lat 33° 57' 12" S.
Lon. 118° 26' 39" E.

Cape of Good Hope
Lat 34° 22' 0" S.
Lon 18° 23' 33.5".





guide to approach the land by, for between Saldanha and Table Bays the depths are regular, and the soundings extend several leagues from the land. From Dassen Island to Robben Island the depth of water is from 50 to 60 fathoms, at 5 miles from the shore, and 3 miles from the land there are from 20 to 22 fathoms; about 10 miles N.W. of Robben Island are 30 fathoms, and 40 miles from Cape Town, in the parallel of $33^{\circ} 30'$, are 110 fathoms.

CAPE OF GOOD HOPE, one of the most southern parts of Africa, was discovered by Bartholomew Dias, the Portuguese navigator, in 1493. Dias, after exploring the Atlantic coast of Africa, as far as Cape das Voltas, 29° S. latitude, was driven out to sea by a storm, and the next land he saw was Algoa Bay. He had thus doubled the south extremity of Africa, without knowing it. On his way back he saw the cape, since named the Cape of Good Hope, to which he gave the name of Cabo Tormentosa, or Cape of Storms. On his return home, the King of Portugal gave it the name of the Cape of Good Hope, as an omen that the Portuguese had now a fair prospect of reaching India, the great object of their maritime expeditions.

TABLE BAY is situated to the north-eastward of that promontory which stretches towards the Cape of Good Hope, and is easily known by the high mountains which are contiguous, and which, seen at any considerable distance, have the appearance of an island. The highest of these is at the south part of the bay, and known by the name of the Table Mountain, being 3,582 feet above the level of the sea, flat at top, and sloping almost perpendicularly down at its eastern end, where it is joined to a rugged peaked mountain, named the Devil's Hill, nearly equal in height, the division forming an apparent gap or chasm between. Table Mountain falls down also to the westward, in a similar steep and sudden manner, from its summit to a considerable distance, the farther declivity being abrupt, until it joins the foot of Sugar-loaf, or Lion's Head, a mountain whose elevation is 2,160 feet: this is joined on the northward by an oblong hill, 1,000 feet high, and named the Lion's Rump. On the top of the Lion's Head a flag is displayed whenever any vessel appears in the offing, and near the summit is a spring of good water. The Table Mountain, Devil's Hill, and Lion's Head, make in fact but one mountain, for, though disjointed at their summits, they unite at a very considerable height above their base; the Devil's Hill appears broken into angular ragged points, while the Lion's Head is rounded similar to a dome, and looks like a work of art.

CAPE TOWN is situated in the S.E. part of Table Bay, and built upon a shelving plain, which gradually rises to the foot of the Devil's Hill, the Table Mountain, and Lion's Head; the last of which stretches out to the northward, and shelters the bay from westerly winds. The town is defended by numerous forts and batteries, and all kinds of refreshments can be readily procured for shipping, on reasonable terms; water is plentifully supplied at the pier, being conveyed there in pipes, and commodiously calculated for the accommodation of the boats.

Table Bay affords an excellent and secure place for shipping in the summer months, when the S.E. winds prevail; but when the N.W. winds come on, vessels commonly are obliged to stretch round to the eastward of the cape, and take shelter in Simon's Bay. Ships bound to Table Bay should endeavour to make the land to the southward of it, on account of the southerly winds and northerly currents which frequently prevail there: many, for want of this precaution, have fallen in with Dassen, or Coney Island, or farther to the northward.

All vessels going to Table Bay should pass between Robben Island and Green Point, while those bound from thence may go to the northward of the

island ; for the strong S.E. winds produce a favourable current between that island and the northern shore, while that between Robben Island and Green Point will be running into the bay ; the ground between these latter is foul. Vessels coming in from the southward may, as they advance, come within $1\frac{1}{2}$ mile of the shore, which is bold, and they will have at that distance 50 and 60 fathoms water ; but Green Point may be approached to the depth of 10, 9, or 8 fathoms, without danger ; they may then steer towards the shipping in the road, in 8, 7, or 6 fathoms, regular soundings. The proper anchorage in the bay is abreast of the town, on a sandy bottom. In the summer months a ship may moor in 7, 6, or 5 fathoms, with Green Point bearing N.W. $\frac{1}{4}$ N. ; the bottom of Table Mountain, S.W. $\frac{1}{4}$ S., the flag-staff on the Lion's Rump, W. $\frac{1}{4}$ S., and the house of Penguin Island, N. $\frac{1}{4}$ W., at the distance of half to one mile from shore, and from one to one and a half mile from the town. When N.W. winds are expected, ships should not anchor in less than $6\frac{1}{2}$ or 6 fathoms, because the swell runs more regular than in shoal water, and at these times they should ride with a whole cable or more, lest they should drive, in which case it would be difficult to bring them up again. The best ground is in from 5 to $7\frac{1}{2}$ fathoms ; farther out, with the Lion's Head in one with, or open to, the northward of the Lion's Rump, the ground is rocky all across the bay.

The prevailing winds, near the cape and in Table Bay, are from the S.E. and Southward, during the summer, that is from October to April, the S.E. winds blowing more or less in every month of the year, and generally bringing settled weather. The N.E. winds are less frequent than any, and never continue long. The S.E. winds extend more than 200 leagues to the eastward of the cape. In May, June, July, and August, the S.W. and West winds blow strong, and are often attended with fogs and cloudy weather ; but the N.W. winds are most violent in these months, and frequently continue blowing for several days together, with a clouded sky, accompanied at times with lightning and showers of hail or rain. These winds extend to 27° S., and to a considerable distance Westward. The summer continues from October to April, during which season it has been thought safe for ships to lie in Table Bay. The N.W. gales are occasionally experienced about the cape in every month in the year, but they seldom blow home in Table Bay during the summer months, although there are instances of ships having been driven on shore by them in April. The Dutch commonly fixed on the 10th of May as the period for ships to leave this place, and never suffered them to remain there after that time, on account of the approaching season, when N.W. gales were expected to set in, which blow so violently, and raise such a mountainous sea, that it is almost impossible for any ship to ride at her anchors.

In the fair weather season regular sea-breezes from S.W. and West prevail in the moorings, and continue until noon, sometimes longer ; they are then succeeded by S.E. or E.S.E. winds from the land, which generally blow fresh during the remaining part of the day, and frequently until the following morning, when the sea-breeze returns again. Whenever the Table land in the summer months begins to be clouded, it indicates a strong E.S.E. or S.E. wind, which, soon after it is clouded over, comes on, and blows excessively hard, sometimes for two or three days, particularly in January, February, and March. With these winds ships frequently part their cables, or bring both anchors ahead ; therefore ships ought to moor with good cables ; and it is usual, as soon as moored into this bay, to strike yards and topmasts, and make all as snug as possible. When the Table land is free from clouds, the south-easter will be moderate. It is high water in Table Bay at 2h. 30m. full *and change*, and the tides seldom rise above 5 feet.

Lights.—Since the preceding instructions for Table Bay were written, a lighthouse 25 high has been built on Mouille Point, which shows a fixed light at 40 feet above the sea, visible about 10 miles. There is also a lighthouse on Green Point, 608 fathoms more to the westward, which shows two fixed lights vertically; these lights, says Captain Owen, “are in one about S.W. by W., and appear to be of no other use than to assure the navigator which is the light-house, if he should see other lights. I have seen the lights clearly off deck at 16 miles distance, but they will not make clear as two lights until within 6 or 7 miles to the westward of them, and from the northward one light only will be seen.”

The following instructions, by Captain Owen, for entering Table Bay by night, by the plan constructed on the observations made by H.M.S. *Leven*, November, 1825, bear date March 1st, 1842.

1. *To enter Table Bay from the northward*, meaning to pass outside of Robben Island, a ship should keep the light to the eastward of S. 9° E., or about S. by E. until she get soundings under 20 fathoms, at a little more than a mile from the lighthouse; she may then steer E.S.E. or E. by S., not to come under 10 or 12 fathoms, until the light bears W.S.W.; she may then steer for the anchorage, and may anchor in from 7 to 6 fathoms, as soon as the lights are shutting in behind the Lion's Tail. This track leads about a mile clear of danger on Green Point; but a ship need not approach it so near, if she have, by seeing Robben Island, ascertained by its bearings that she is clear of the Whale Rock, in which case she may round it at a greater distance from Green Point, if desirable, but the soundings in that case will not alone be a sure guide.

2. *In coming from the S.W.*, a ship should not get less than 40 fathoms before the light bears S.E. or E.S.E., nor less than 20 fathoms before it bears S. by E., when the preceding directions may be followed.

3. *From the northward* (inside of the Robben Island) the light should be kept about S.W. by S., until a ship have passed that island; in doing which she may have some casts from 8 to 6 fathoms; and when on that course the water deepens to 10 or 12 fathoms, she may steer for the anchorage by the plan as before directed. In beating round Green Point, a ship should never shoal her water under 11 or 12 fathoms, until she have brought the light to bear W.S.W., as before said. In beating between Robben Island and the main, to enter Table Bay, the soundings may be taken from the island, as it shoals-to very regularly. In standing towards the main, it appears prudent to tack at the first cast of the lead after the water shoalens.

In these directions it is taken for granted, that a ship will always keep her leads going. By day, or when the shores or surf can be seen, or indeed under any circumstances, the plan ought to be a sufficient guide.

The lighthouse having been erected on Mouille Point subsequently to that on Green Point, to which latter the above instructions have reference, the following further instructions by Mr. J. Bance, the *Port Captain*, are added.

In standing in from the S.W., a ship should not pass the lights on Green Point nearer than a mile; nor should the course be altered from the eastward to the southward, with the intention of steering for the anchorages; nor should the ship be brought into less than 14 or 15 fathoms water, before the lights on Green Point bear S.W. by W. $\frac{1}{4}$ W. (they will then be in one), when the light on Mouille Point will instantly be seen (and not before), bearing nearly S. by W. A ship may then alter the course from the eastward, and steer S S.E. for the centre of the anchorages, and anchor whenever the lights on Green Point are shut in (by sand-hills near the Mouille), and the

light on Mouille Point bears N.W., distant about a mile, in from 6 to 8 fathoms water. Vessels of light draught of water may steer S. by E. $\frac{1}{4}$ E. for the anchorage, and anchor with Mouille Light bearing N.W. by N., in from 4 to 5 fathoms of water.

The ship's distance from the shore, when the light on the Mouille appears, may be readily ascertained by the bearings of the two lighthouses, and the distance between them, which is 1,215 yards.

In coming in from the northward, (inside Robben Island) the lights on Green Point will appear in one (or nearly so), and the light on Mouille Point will also be seen. The directions by Captain Owen, and the appended directions, will be a sufficient guide to the anchorage.

It is earnestly recommended to strangers not to attempt to beat into Table Bay at night, in squally or thick weather. The strictest attention should be paid to the soundings, and the leads kept constantly going. The plan of the bay, by Captain Owen, (upon which the instructions are founded) should also be at hand for reference.

In the Nautical Magazine, 1842, are the following remarks on Table Bay.

"Bound to the Cape of Good Hope, or wishing to pass round it to the Indian Ocean, no particular directions seem to be required. It is only necessary to make something, as quickly as possible, in order to get into the westerly winds, which will be found to prevail from 30° southwards. A strong northerly current will frequently be experienced in crossing towards the Cape. On the present occasion I found it particularly strong, and on nearing the land, when bound to Table Bay, it requires to be attended to, as it runs almost constantly to the northward, or a vessel will have difficulty, and lose time in gaining the bay. For recognising the land in the neighbourhood of Table Bay no other remarks seem necessary than those given in the Books of Directions, the land being very remarkable. The directions by Captain Owen for entering the bay are also very plain, pertinent, and easily understood. It is very surprising, however, that so many valuable vessels which have been lost on entering this bay, many during the night, but others during the day, and under favourable circumstances. A great many commanders of vessels on nearing the high land, during the day, and fancying themselves near the port, run on, and enter, or attempt to enter, during the night, thinking it an easy matter from the presence of the light on Green Point, the width of the entrance, and the apparent simplicity of the directions. I certainly think, however, when a man is entrusted with valuable lives, particularly in passenger and emigrant ships, when the decks are crowded, and all, eager in anticipation of landing, are bustling about, insensibly interrupting the necessary duties of the vessel, and abstracting the commander's attention from the great care requisite to the general safety, that "discretion is the best part of valour;" and would seriously recommend every one not quite sure of being in with daylight, to haul off and enter in the morning. I know from experience that it is very difficult to judge correctly of a vessel's distance from the entrance. The land immediately contiguous being very high, and appearing much nearer than it is, renders it not only very difficult to judge correctly, but there is generally a haze over the low land. I have also invariably found, that when a light house is situated immediately in front of, and underneath high land, it adds very much to the difficulty of judging correctly of its distance at night. Besides, although it appears easy to keep the light on a certain bearing, and run into 18 fathoms, then haul into the bay, &c., according to certain directions, it is not so easy in a short-handed merchantman going 4 or 5 knots, to get soundings in 18 fathoms, with sufficient facility. It is *useless, however, arguing such a point, and I strongly recommend every*

one to wait for daylight: a few hours are of little importance, and they can be easily made up, by a strict attention to dispatch, when once fairly at anchor.

Table Bay, as a place of discharge, and even as a place of call for refreshments, has obtained a very bad reputation. Many owners put a positive veto on their vessels going there. I think, however, its bad character is over-rated, and an unnecessary degree of fear entertained with regard to the safety of vessels riding in the roadstead. I write advisedly, when I affirm, that three-fourths of the wrecks which have taken place on entering this bay, having arisen from running unnecessary risks, or from the carelessness and ignorance of the parties in command. Neither would a vessel properly moored on arrival with good ground tackle, and a good stock of cable before the violence of the gale sets in, be so liable to drive or part her cables. A sufficient degree of care and attention is seldom paid to seeing anchors laid down clear, and in a proper position. In most cases as soon as one anchor is gone (that very likely foul from the vessels having head-way, and overlaying it with the cable), the master goes on shore, where he remains, never thinking of mooring, in all probability, until a gale commences. It is also quite common for vessels calling for a temporary purpose, to get huddled together in such a manner as to prevent them paying out cable when it commences blowing. The same circumstance occurred during my present stay in the bay. The consequence was, so soon as the gale commenced, four or five vessels were all driven together; and had the gale been of ordinary violence they must have gone on shore, and added to the unjust degree of dread with which this anchorage is viewed at the present time."

HOUT BAY.—At about 3 miles to the southward of the lighthouse on Green Point is the Sugar-loaf or Lion's Head, having off it two clusters of rocks, named the Lion's Paws, which are distant about half a mile from the shore; and 7 miles farther is a remarkable projection of rocks, extending from the shore near the promontory of Chapman's Head. Besides these there are several other rocks near the shore; indeed the whole coast hereabouts is encumbered with rocks and foul ground, so that it must not be very closely approached. On the east side of Chapman's Head is Hout Bay, which is a snug little cove where shelter may occasionally be obtained; but in running into it caution will be required to avoid a dangerous rock above the water lying 2 miles westward of the bay, at about three-quarters of a mile from the shore. This rock is named the Vulcan, and within it are some dangerous breakers, with an islet and reef, named Duyker's Islet and Shoal.

The entrance to Hout Bay is about $1\frac{1}{4}$ mile broad, and has a depth of 18 to 12 fathoms, but rather open to the S.W. You enter along the eastern shore, which is very high and rugged, and quite inaccessible; and having passed the middle of the entrance, luff up under the west point, and there anchor. The summit of a remarkable peak, Constantia Berg, upwards of 3,000 feet in height, seen over high cliffs, brought to bear E. $\frac{1}{4}$ S. (E.N.E.) will lead directly to the bay. On the west point, named York Point, there is a small battery, and on the opposite side there is another, and a block-house.

Hout Bay was visited on the 29th of March, 1819, by H.M.S. Podargus, commanded by Captain the Hon. Henry John Rous, who describes it in the following terms:—

"With the exception of Saldanha Bay, there is no harbour so commodious, safe, or that has so many advantages, as Hout Bay. Situated at the south-west extremity of the Cape Colony, it presents a secure retreat to ships not able to weather Cape Point in strong south-easterly winds, when they could

not beat to the anchorage in Table Bay; and in the winter, to ships exposed in north-westerly gales, when it would be impossible to work into False Bay, and they would not dare to attempt the anchorage on a lee shore in Table Bay.

Yet, with this local superiority, situated in a rich and healthy part of the Colony, with abundance of water, a large farm a mile distant, which supplies the navy contracts with beef and vegetables, and within 14 miles of Cape Town, it is entirely neglected.

The harbour forms a basin about 5 or 6 miles in circumference where, with moorings laid down, twenty sail of the line can be land-locked, in from 6 to 9 fathoms water, fine sandy bottom. High water at full and change at 3 o'clock; rise about 6 feet. The entrance is remarkably fine and cannot be mistaken; deep water on either shore within a stone's throw.

The patch of rocks in Captain Rous' plan is $1\frac{1}{2}$ mile to the westward, and about one mile from the shore; they are visible quite out of the direction of ships approaching from the eastward, and may easily be avoided in running in from the westward with a north-westerly wind. I have no doubt that there is a good passage in-shore of them.

The other objection assigned is, that a heavy swell rolls in to the land, with a south-westerly wind. But this swell cannot dangerously affect ships lying in a land-locked harbour: and south-west winds are seldom prevalent during the dry season at the Cape.

I presume to state my opinion that Hout Bay, in every point of view, is the proper situation for our dock-yard establishment. Its great facility of ingress and egress, which was exemplified soon after the Cape first fell into our possession, by a French frigate having run in, completed her water, obtained supplies of cattle and vegetables, and again made sail with impunity; in consequence of which, a fort and block-house was erected on the eastern shore; and a captain's guard of 130 men stationed there during the last war. The short distance from Cape Town both by sea and land, the superiority of the harbour, and rich country surrounding it, render it infinitely superior to Simon's Bay, which is exactly the reverse in all those leading points. Besides the difficulty of getting to Simon's Bay either in the north-west or south-east gales, ships are liable to be detained three weeks by the latter, whereas at Hout Bay the wind blows out of the harbour every morning at daylight.

When the numerous dangers in False Bay are considered, and the number of wrecks every year in that and Table Bay, I cannot help regretting that this excellent harbour should remain useless, and that such an indifferent situation as Simon's Bay should be chosen for our Naval Arsenal."

About 5 miles to the southward of Hout Bay is Snake's Head, or Slang Kop Point; the coast between forms Chapman's Bay, but it is wholly encumbered with rocks, and continues so from Snake's Head to the southernmost extremity of the Cape of Good Hope, which is a high precipitous cliff, with a peak 1000 feet in height; it lies in latitude $34^{\circ} 22' S.$, and longitude $18^{\circ} 24\frac{1}{2}' E.$, and has a reef extending nearly a mile to the westward. About a mile eastward of the cape is a small rock above water, named Dias Rock, lying a cable's length from shore. The Bellows is a large rock, even with the water's edge, over which the sea constantly breaks; it lies with the south pitch of the cape bearing North (N.N.W. $\frac{1}{4}$ W.) distant 2 miles, and Muisingsberg Mountain, in N.W. corner of False Bay, shut in with the Cape Point. The Anvil is another rock, separated from the Bellows by a safe channel (which, however, it may not be wise to attempt) of 10 fathoms; it has 10 feet water over it, and lies with the Cape Point bearing N.N.W. (N.W. $\frac{1}{4}$ W.)

distant $1\frac{1}{2}$ mile; the Bellows W. $\frac{1}{4}$ S., 2 miles; and the Devil's Peak, in Table Bay, just open of Muisingsberg Mountain. A master of the navy has asserted, with evident probability, that there are other rocks near the Anvil, but we have no particulars respecting them.

FALSE BAY.—This extensive bay is formed by the Cape of Good Hope on the west side, and Cape False to the eastward; the latter is a steep bluff, resembling a quoin, which may be seen 8 leagues distant, and appears to lean over to the west, when viewed from the southward; it is often named Hangk-lip, and sometimes Hottentot's Point; the distance between the two capes is about 16 miles. Across the entrance of False Bay the depths of water are from 40 to 50 fathoms; but a little to the westward of the middle of the entrance there is a bank of rocky ground, named Whittle's Bank, with soundings on it from 15 to 30 fathoms, having 45 to 50 fathoms within it, and 50 to 60 fathoms to the southward.

The middle and eastern parts of False Bay are free from dangers, but the ground is foul and unfit for anchorage. On the western side, at 4 miles from shore, is the Trident Rock, having only 12 feet over it. This rock is about 20 feet long, and 10 broad; but there is a rocky bank surrounding it, of uneven soundings, and two cables' length in diameter, having from 5 to 15 fathoms of water. The Trident is steepest on the S.E. side. At 40 fathoms south of it is the Whittle Rock, of $4\frac{1}{2}$ fathoms; and there are several rocks at about a cable's length to the N.W., having 4 and 5 fathoms. From the Trident Rock, the Cape Point of Good Hope bears S.W. $\frac{1}{2}$ W., $7\frac{1}{2}$ miles; the north point of Little Smith's Winkel Bay N.W. by W. $\frac{1}{4}$ W. (West), 4 miles; and Noah's Ark, on the south side of Simon's Bay, N.W. by N., 6 miles.

As you enter False Bay from the southward, you will perceive a ridge of rugged hills to the northward, which continue as far as Table Bay, and in clear weather the Table Mountain may be seen 20 leagues, but quite distinct within the entrance. On coming in from the westward with a N.W. wind, a ship may pass to the southward and eastward of the Bellows and Anvil, at the distance of two miles, or according to circumstances. From abreast of the Bellows, at 2 or 3 miles, haul up no higher than E.S.E., or E. by S., until you have run 5 or 6 miles in this direction, whence you may steer E.N.E. and N.E., till the cape bears W.N.W., and you will be clear of the sunken rocks. In advancing thus, you may always gain a proper anchoring-ground, in case of a calm, or an unforeseen shifting of the wind.

SIMON'S BAY is situated about 11 miles to the northward of the Cape Point, near the N.W. corner of False Bay, at the foot of the highest mountain on the coast. From April to September, when Table Bay is unsafe, ships put in here, as it is considered secure in all seasons; for, although it is open to N.E. and Easterly winds, they never blow sufficiently strong to cause any apprehension of danger. Cape Town is distant about 6 leagues from Simon's Bay, and provisions and refreshments of every description may easily be procured; the water is also good and abundant.

At a small distance from the south side of Simon's Bay lies a small islet or rock, in form of a barn, named, from its appearance, Noah's Ark; and at about three-quarters of a mile to the N.E. of it is a small reef, at the water's edge, named the Dispatch or Roman Rocks: between these rocks is the channel into the bay.

Seal Island lies about 2 leagues E. $\frac{1}{4}$ S. (E.N.E.) of the Roman Rocks, and is surrounded by numerous straggling rocks, some above, and others under water; they extend 2 or 3 miles to the southward, and nearly 4 miles to the eastward, and may be frequently seen by breakers on them when the

sea runs high; vessels should therefore be careful of them, when turning to windward.

As you approach Simon's Bay, Noah's Ark will soon be discerned; it is a smooth level island, appearing like a pontoon at a distance; but the most conspicuous object, and first to be seen, are the white sand-downs, appearing like snow, in the hollows between the mountains to the N.W. of Noah's Ark. You may coast along Noah's Ark, as it is steep-to, and has 9 fathoms close to it; in the channel between it and the Roman Rocks are 10 to 15 fathoms; from hence a vessel should steer direct for the white sand-downs to the anchorage. If working with a N.W. wind, you may go to the northward of the Roman Rocks, taking care not to go too near them, as a detached rock of 3 or 4 fathoms is said to lie on that side.* This is also a clear channel, and may indeed be deemed more convenient with the winds from the N.W., as it is double the width of that between the rocks and Noah's Ark.

Ships may pass to the eastward of Whittle and Trident Rocks, between them and the reefs, to the southward of Seal Island, though the western channel is undoubtedly to be recommended to strangers. Should you, however, wish to adopt the former, do not bring the Cape point to the southward of S.W. by W., until Noah's Ark bears N.W. by W., but when on the star-board tack, nothing to the northward of this bearing; you will then go clear of the Whittle Rock. Do not go too near Seal Island, on account of the rocky patch which lies to the southward of the island, over which the sea will oftentimes break. The anchorage in Simon's Bay holds well, being sand and clay: it is here high water at half-after 3 o'clock, full and change, and the rise of tide is seldom more than 3 feet, with very little current at any time.

Simon's Bay may be considered a safe retreat for thirteen or fourteen sail of ships, where they will be moored in security at all seasons, but being small, it cannot contain a numerous fleet, sheltered from S.E. winds. The best situation to lie in, is to bring Noah's Ark and False Cape in one, bearing S.S.E. $\frac{1}{4}$ E. (S.E. by E.), the Roman Rocks S.E. $\frac{1}{4}$ E., distant 2 miles, and the south or east point of the bay S.S.E. $\frac{1}{4}$ E. (S.E. by E.) In this berth, you will be distant about one mile from the shore, and well sheltered from all quarters. If bound to the eastward out of Simon's Bay, leave as soon as the north-westerly winds begin to blow; but if you intend to sail to the westward, you must wait till the north-westerly winds are on their decline, and get under sail on the road, so soon as those winds shift from W.N.W. to West, for, as they most commonly veer from thence successively to S.W., South, and S.E., they will prove fair for doubling the Cape of Good Hope, and lying up afterwards to N.W. The only directions to be given for leaving the bay is to reverse those for entering it.

In 1845 a light-vessel was placed off the Roman Rocks in $7\frac{1}{2}$ fathoms water. It is painted red, and carries a revolving light at an elevation of 37 feet above the level of the sea. During the day-time a red flag (or perhaps a ball) is shown when vessels are observed. The following are the bearings:— the Roman Rocks, South a cable's length; the Whittle Rock, S.S.E. 7 miles; Seal Island, E. $\frac{1}{4}$ S. $6\frac{1}{2}$ miles; and Miller Point, S. $\frac{1}{4}$ W. $3\frac{1}{2}$ miles.

In reference to this light-vessel. Mr. J Brown, of H.M.S. Winchester, drew up the following sailing directions:—

“When a vessel has rounded the Cape of Good Hope from the westward, the above-mentioned light will open clear of Miller Point on the bearing of

* This rock may be the following, which was discovered by the surveyors, on Feb. 19th, 1853, who found a rock of 15 feet water, bearing from the Roman Rocks. N.N.E. $\frac{1}{4}$ E., $1\frac{1}{2}$ cable's length, and from the lightvessel, N.N.E. $\frac{1}{4}$ N., one cable's length.

N. by E. ; and, if it be intended to work up False Bay, between the Whittle Rock and the western shore, the light should not be brought to the westward of N. by W. $\frac{1}{4}$ W., until she is well up with the high land about Miller Point, and consequently to the northward of the Whittle ; nor should the light be brought at any time to bear to the eastward of north, on account of the rocks off the western shore.

If the vessel is to work up to the eastward of the Whittle, the light should not be brought to the north of N.N.W. $\frac{1}{4}$ W., in order to avoid that rock ; nor to the westward of N.W. by W. $\frac{1}{4}$ W., so as to give a sufficient berth to Seal Island and the shoal near it. But by whichever of those channels a ship approaches, short tacks should be made until certain of being within 5 miles of the light.

With a leading wind the light may be brought to bear N. by W., which will clear the Whittle ; and that course should be continued till within a mile of the light. The light-vessel must then be well opened on the port bow, so as to round her at not less than half a mile distance. When the light has been brought to bear S.S.W., steer in west for the anchorage, and bring up in 14 to 10 fathoms, according to the weather.

When coming from the eastward round Cape Hangklip, it will be observed that the Whittle lies nearly in a direct line between the cape and the light ; and therefore, if the wind be fair, bring the light to bear N.W. by N., and steer for it.

These instructions are intended for seamen not acquainted with Simon's Bay ; those who know the passage between the Roman Rocks and Noah's Ark, will probably adopt it in the day-time, but from the position of the Phoenix Rock, and the narrowness of the passage, all ships at night should pass to the eastward of the light-vessel, and haul round her to the northward."

GORDON BAY.—In the north-eastern part of False Bay is Gordon's Bay which affords good shelter from S.E. and northerly winds, and has several fair landing-places from half-flood to half-ebb, but at no other time of tide, excepting at the bar, which is formed by a bank of sand, and cannot damage the bottom of the boat : this bank has generally about two feet water over it, but at low water, spring tides, it is perfectly dry. The other landing-places are shown on the chart, and with S.E. winds are smooth ; but you must always be attentive to the tide. Within the lower dotted line on the chart is good anchoring ground, holding well, being of coarse brown sand ; here vessels may anchor in from 13 to 15 fathoms, with the peak of Hangklip just open to the southward of the south point of Gordon's Bay, and with the upper farm-house open to the left of the lower farm-house ; small vessels may ride farther in, where the inner anchor is placed in good security, the capes being completely shut in,—Gordon's Bay south point effectually keeping off the sea. To ships working out of Simon's Bay, Gordon's Bay will afford ready shelter on the approach of night, for they can stretch into the outer part of it, and anchor for the night, well in shore, with a kedge or stream anchor ; for it is generally observed, that when the wind blows strong from the S.E. at the anchorage in Simon's Bay, and other parts of False Bay, a ship will not have advanced half a mile within Gordon's outer bluff before she will get into a light breeze, scarcely sufficient to carry her to the anchorage : here she may lie until daylight ; then weighing and stretching out into the true wind, and work out either round the Cape of Good Hope, or Cape Hangklip.

Gordon's Bay will prove equally safe and advantageous for vessels standing in for Simon's Bay late in the evening, and not considering it safe to run for anchorage there ; for then they may stand over for Gordon's Bay, and anchor

for the night: they cannot mistake it, the land in the front, when standing to the eastward, being so very remarkable. This might easily be made a good place for shipping, for on each side of the bar are rocks, with plenty of large loose stones about them; and by piling up these stones upon the rocks, a pier might be constructed to any distance out; and if a swinging crane was erected on the south pier, it would considerably facilitate the lading and unlading of the boats. The same plan might be pursued with the bay northward of the fort. All the landing-places afford plenty of water, running down in streams, but the best is near the fish-house; here, although the passage is difficult and intricate, it has a spacious beach, well defended from the sea, by reefs running in opposite directions, the only obstacle being the delay for the tide. Fruits, vegetables, and stock can be had here, but not expeditiously, as it must be brought from a considerable distance.

The whole eastern coast of False Bay, from Gordon's Bay to Cape Hangklip, wears a dismal inhospitable appearance; it is one continual rocky chain, and scarcely approachable. Colebrook Bay, so named in consequence of the wreck of the Colebrook, is to the southward of Gordon's Bay; and farther southward is Pringle's Bay, where Admiral Pringle is said to have landed.

From October to April, though south-easterly winds commonly prevail, yet they seldom continue longer than 5 or 6 days at a time, being constantly succeeded by winds that are variable; it therefore sometimes happens that these winds, after blowing strong for the day and night, will cease towards morning, and be followed by a breeze from the W.N.W. If this temporary change can be taken advantage of, a ship may, by weighing directly it comes on, get out to sea before the south-easterly wind returns again; but should she be unable to clear out of the bay, it will be prudent to return again to the anchorage in Simon's Bay.

The Cape of Good Hope is frequently the boundary of different weathers; homeward-bound vessels very often experience variable winds and cloudy weather to the eastward of the cape; while to the westward of the cape, there will be settled weather, and a steady south-easterly wind, particularly in the summer season.

GENERAL REMARKS ON THE WEST COAST OF AFRICA.—The following general remarks on the West Coast of Africa are by Commander Matson, R.N.:—

Seasons.—On the west coast of Africa, south of the equator, the rains begin generally early in November, and continue until the middle of April. They are early on the coast of Angola and Benguela, and later to the northward of the Congo. To the southward of 10° S. there is occasionally not any rain whatever for several years; but sometimes in the months of November and December, it falls in excessive quantities, and the country then becomes in parts almost inundated. There was not any rain near Benguela during the years 1840, 41, and 42; but the appearance of immense water courses, in which were large trees that must have been carried by the torrents many miles from the interior, amply corroborate this statement.

About Cabenda and Malemba the rains are very heavy, from the beginning of December until the middle of January. To the southward of 10° S. the months of January and February are very fine, but oppressively hot and sultry.

The months of March and April are the most unhealthy. This is owing to the exhalations from the earth after the heavy rains, which the light sea-breezes are not sufficient to dispel.

From May to September are the most pleasant and healthy months; the sky at this time is generally overcast or cloudy; in the months of June, July,

and August, a thick fog (named the "smokes") prevails; it is not caused by exhalations, and is neither unwholesome nor unpleasant. Tornadoes occur in September or October; they generally blow from south-east, and are not nearly so violent as those to the northward of the equator, nor are they usually accompanied with heavy rain.

Winds.—From Cape Voltas to Cape Negro the wind blows constantly from south a double-reefed topsail breeze. From Cape Negro to Salinas it continues to blow up the coast from S.S.W.; it becomes more moderate as you get to the northward; and when to the northward of Cape Mary frequently blows from S.W. and W.S.W.

Between Salinas and the River Congo the prevailing winds are south-west during the year. The sea-breeze generally sets in about 1 p.m. from W.S.W., it generally veers to the southward, and continues to blow from S.S.W. or South during the greater part of the night, and becomes very light or calm before daylight. When within 10 or 15 miles of the shore, the land-breeze will reach you, and continue sometimes from sunrise until 8h or 9h. a.m.; but if 30 or 40 miles off shore you will generally have a calm from sunrise until noon. The sea-breeze occasionally sets in from W.N.W. and N.W., and this happens more frequently in the months of October, November, and December. During the "smokes," (in June, July, and August,) the winds are very light, and blow from S. and S.S.E. during the whole twenty-four hours.

At the distance of 80 or 100 miles off shore the south-west winds became more regular; they regularly veer round to the southward and eastward, and imperceptibly unite with the south-east trade. A line drawn from the Tropic of Capricorn, in long. 5° E., to the meridian of Greenwich, in lat. 5° S., may be considered as the eastern limit of the south-east trade.

From the River Congo to Cape Lopez the land and sea-breezes are not so regular. From October to April the winds here are about constantly from S.S.W. and S.W.; and heavy squalls from S.W. and W. occur in December and January. From May to September the land and sea-breezes are more regular, the latter at this time often set in from W.N.W., and blow during the night from S.W. and S.S.W., and then the land-breeze is only felt close to the shore.

Currents.—A current is almost continually running up the coast of Africa, from the Cape of Good Hope to the River Congo, at the average rate of one mile an hour. It is here met by the impetuous stream of that river, which runs with undeviating regularity to the N.W. and N.N.W., at the rate of from 2 to 4 miles in the hour, until it unites with the equatorial current, two or three degrees south of the equator. The stream of the Congo is felt at the distance of 300 miles from its entrance, and may be known by the clayey appearance of its waters, which are of a yellowish olive green colour. From May to October the current occasionally runs to the southward *close to the shore*, and continues to do so for 48 hours.

Rollers and Calema.—A day or two after the new moon, in the months from May to September, a very heavy swell sometimes sets in along the whole coast from 3° to 15° S.; this occurs more frequently during the "smokes." It renders the open bays very dangerous to remain at anchor in, where the water is very shallow. At this time it is nearly a calm, never more than a very light breeze; you can easily warp outside of the heavier rollers by a small hawser; or you may ride by a kedge anchor and hawser; when the chain-cable would snap with jerks, caused by the sudden influx of a large body of water into the bay. During the period of the Calema you cannot land on the coast, except in the surf boats."

TIDES.—It is high water, on the full and change of the moon, at Benin River, at 6 o'clock; Rough Corner, at the entrance of New Calabar, at 5: tides rise 9 feet. At the entrance of Old Calabar, at 6: rise 6 feet. Cape St. John and entrance of the River Gaboon, at 5: rise 7 feet. Off the Calabar and Bonny Rivers, the tide flows in the stream, or offing, till 6 hours. Corisco Bay at 5 o'clock: rise 7 feet. George Bay, in Fernando Po, at half-past 4; rise between 7 and 8 feet. Clarence Cove at 4: rise 7 feet. At Prince's Island the tide rises and falls from 4 to 7 feet. It is high water at St. Paul de Loando, at half-past 4: tides rise 5 feet. In the mouth of the River Coanza the rise is 8 feet; Walwich Bay at 2 o'clock. Springs rise at Angra Pequena between 7 and 8 feet; at Elizabeth Bay 6 feet. It is high water at St. Helen's Bay at half-past 2; Saldanha Bay at 2: rise 6 to 7 feet. At Table Bay at 20 minutes after 2: rise about 5 feet. At Simon's Bay half-past 3: rise 3 feet.

The **VARIATION** on the **COAST OF AFRICA** is as follows:—New Calabar River, $20^{\circ} 7' W.$; Old Calabar, $20^{\circ} 3'$; Fernando Po, 23° ; Corisco Bay, $20^{\circ} 80'$; Cape Lopez, 21° ; River Congo, $21^{\circ} 42'$; St. Paul de Loando, 20° ; Cape Negro, 23° ; Walwich Bay, 23° ; Cape Frio, 24° ; Angra Pequena, 26° ; St. Helen's Bay, 28° ; and at Table Bay, 28° .

SECTION III.

ISLANDS AND ROCKS IN THE ATLANTIC.

THE AZORES.

These islands are situated between the latitudes of $39^{\circ} 45'$ and $36^{\circ} 57' N.$, and longitudes $31^{\circ} 10'$ and $24^{\circ} 55' W.$ They consist of nine islands, in three distinct groups, lying in the direction of W.N.W. and E.S.E., and extending about 330 miles. The north-western group contains the small islands of Corvo and Flores, distant about 114 miles from the central group, which includes Terceira, San Jorge, Pico, Fayal, and Graciosa. The third group, 69 miles to the S.E. of the second, is composed of the two islands of San Miguel and Sta. Maria, and the Formigas Rocks. The general character of the islands is mountainous, of a conical form, and great bulk: the most remarkable among them is the Peak of Pico, whose small sugar-loaf on its summit is so very regular as to appear the work of art; in clear weather this island can be seen upwards of 20 leagues.

On approaching the islands the aspect is unpromising, from the barren appearance of the mountains, and the steep rocky coasts, which nearly everywhere present high and craggy cliffs; but a nearer view exhibits a most luxuriant landscape of vineyards and corn-fields, interspersed with orange and lemon orchards, and open pastures bounded by woods. San Miguel or St. Michael is the largest island, and the residence of the bishop; but Angra, in Terceira, is considered the capital of the group, and the seat of the civil government. Among all the Azores there is not one good port for vessels of burthen, all the anchorages being in open bays or roads, from which ships are often obliged to put to sea at a very short notice. The Channels among

the islands are clear and deep, but strong currents set through them, and the Florida or Gulf stream is at times sensibly felt here. From the nature of the land, vessels are subject to sudden calms, squalls, and eddy winds, by approaching too close to the shore.

The trade of the Azores was formerly a monopoly of Portugal, but it has been thrown open to other countries, whence woollens, hardware, boards, staves, pitch, tar, iron, &c., are imported; in return for which wine and fruits are the chief payments. From the mother country the payment of its imports consisted principally in dispensations, indulgences, images of saints, sacred relics, &c.

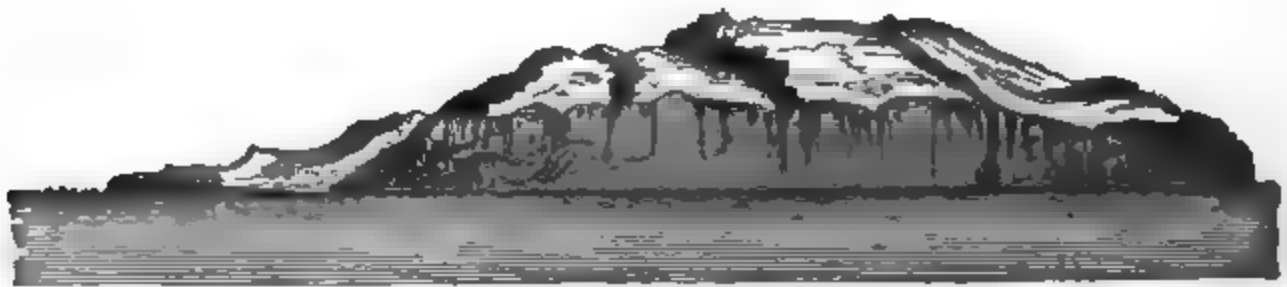
The climate is mild and pure. The winter, though attended with heavy storms, is not severe, nor are the heats of summer oppressive, surrounded as these islands are by such an expanse of ocean. The Portuguese settlers naturally introduced their own religion, manners, and customs, which their almost undisturbed possession, and a similarity of climate to that of their own country have contributed to maintain. Regularly built towns, handsome churches, large convents and monasteries, and the prevalence of whitewashing their buildings, are the same features as are found in Portugal. The population of the islands is computed to be under 200,000 souls.

CORVO.—This island is the northernmost of the Azores, and is formed by a single volcanic mountain. Its extent from north to south is $3\frac{1}{4}$ miles, from east to west $2\frac{1}{4}$ miles, and in circuit it exceeds $9\frac{1}{4}$ miles. The following description is by Captain A. T. E. Vidal, R.N., who has lately been employed in surveying this group of islands.

"The low extreme points of Corvo are comprised between the parallels of $38^{\circ} 39' 54''$ and $39^{\circ} 43' 28''$ N., and the meridians of $31^{\circ} 5' 25''$ and $31^{\circ} 8' 20''$ W.; and the church, which is the best defined object, is in lat. $39^{\circ} 40' 9''$ N., and long. $31^{\circ} 7' 16''$ W.

The south end of the island bears the name of Ponta de Pesqueiro-alto. On the eastern side of it, in front of the village, there is a stony beach about 200 yards in length, on which a few fishing-boats are usually hauled up. Beyond this beach the coast presents a wavy line of high bold rocky cliffs, with a narrow border of thin debris lying at the foot of them to Ponta de Casa, its general direction being N. 52° E., and the distance one mile and three-tenths.*

Immediately off the point, which is sharp and well defined, and at the distance 60 or 70 yards from it, there is a rock just visible above water, on which the sea breaks violently, and there is a similar rock a quarter of a mile N.N.E. of it. On the top of the point, about 400 yards within the cliffs, is a hill 488 feet above the sea.



Pesqueiro Point.

Rosario.
N.N.W. $\frac{1}{4}$ W.Corvo Island.
(South-east side.)

Casa Point.

* In this description of Corvo, the bearings all refer to the true meridian.

From Ponta de Casa the next extreme point is that of L'Este, bearing N. 16° E., and distant 1 mile. The coast falls back a little to the northward of the point, but continues very similar in character, only the cliffs are of greater elevation. Ponta de l'Este, as its name implies, is the eastern extreme of the island.

The quality of the bottom, in the parallel of Ponta de Casa, is generally a fine sand, varying much in colour, from light speckled to brown, and almost black: 19 fathoms will be found at the distance of half a mile; thence it deepens rapidly, and at three-quarters of a mile there are from 60 to 70 fathoms: the edge of the bank (200 fathoms) is 1 mile from the point.

In the parallel of Ponta de l'Este the bank extends one-tenth of a mile farther out, and is generally deeper, there being 17 fathoms one quarter of a mile from the point, and at half a mile 40 fathoms, fine sand.

From Ponta de l'Este the Ponta de Nordeste bears N. 16° W., distant one mile and one-tenth. Between them, one-third of a mile from the first named point, is the small rocky projection of Cabeça Negra; three little detached rocks lie at the base of it, and above it is a cultivated hill.

The cliffs increase in elevation as you proceed northerly, though a deep ravine breaks through them on the north side of Cabeça Negra. Point Nordeste is a bold bluff 760 feet above the sea. From it some large fragments have fallen, occasioning a little extension of the narrow beach around it. To seaward of this point, bearing from it N. 51° E., and distant three-tenths of a mile, lies a sunken rock, named Baxo de Nordeste. It is a single block of stone of very small extent, steep-to on all sides, and has a depth of 3 or 4 feet over it at low water.

In the parallel of the point, at a quarter of a mile from land, the depth is from 17 to 20 fathoms; at half a mile 25 to 30 fathoms; at three-quarters of a mile 32 fathoms; thence it falls rapidly, and at one mile there is no bottom with 200 fathoms. On a north-east bearing from it the soundings are similar at the same distance, and the quality of the bottom generally is a fine sand of various colours, with an occasional cast of rock.

The next point westward is Joao de Moira, bearing N. 57° W., distant about 0.65 of a mile, and from thence Ponta de Norte, the north extreme of the island, bears N. 79° W., about the same distance. The coast between these points presents a series of high inaccessible cliffs, fronted as before by a narrow belt of stones; and deviates little in the outline.

From the top of the cliffs the land behind them rises with great abruptness to the margin of Caldeira, a height of 2,200 feet, where the horizontal distance from the sea does not exceed 2,500 feet.

Ponta do Norte is a huge rock 368 feet in height, jutting out nearly 150 yards at right angles with the shore on either side of it. It is inaccessible from the sea; and the north, or outer face of it shows an overhanging cliff, which renders it remarkable when viewed from the east or west.

S. 87° W., three-tenths of a mile beyond Ponta do Norte is a small black elevated islet of naked lava: the coast between them forms a little bay, the shore of which is profusely scattered with huge fragments of rock fallen from the enormous cliffs behind them; and S. 47° W., two-tenths of a mile, from the outer point of this islet is Ponta de Torrais, the north-west extreme of the island. This north-west point is very remarkable: it runs directly down from the north edge of the crater into the sea, a sharp serrated ridge of dark lava. There is a large rock at the extreme point of it, and on the north side, in the space between it and the islet, and several low detached rocks and a *flat narrow pier* of lava projects from the shore towards them. Outside these *rocks, 300 yards north of Ponta Torrais*, with Ponta do Norte bearing East,

there is a sunken rock on which the sea breaks violently in stormy weather. The point is surrounded by inaccessible cliffs, and on its southern side there is a depth of 7 fathoms close alongside them.

The soundings around the northern shores of Corvo are irregular near the land, and under 30 fathoms, generally rocky. In the meridian of Ponta de Joao de Moira there will be found 8 fathoms, about 250 yards from the point; at a quarter of a mile 15 fathoms; at half a mile 30 fathoms; at three-quarters of a mile 37 fathoms; at one mile 45 fathoms; and at one mile and a half 200 fathoms, the edge of the bank.

In the meridian of Ponta do Norte there are 4 fathoms close alongside the cliff; 300 yards off 6 to 7 fathoms; at a quarter of a mile 12 fathoms; at half a mile 30 fathoms, fine brown sand; at three-quarters of a mile 40 fathoms; at 1 mile 50 fathoms; from thence the bank descends rapidly, and no soundings will be obtained with 200 fathoms at the distance of a mile and a half. Around Ponta Torrais the bottom is always foul. In its meridian with the sunken rock, and point in line, there are 17 fathoms three-tenths of a mile off; at half a mile 23 fathoms; at three-quarters of a mile 32 fathoms; and to the edge of the bank it is $1\frac{1}{4}$ mile.

In a W.N.W. direction soundings extend off $1\frac{1}{4}$ mile. In the parallel of the point, at the distance of a quarter of a mile there are 13 to 14 fathoms; at half a mile 18 to 20 fathoms; at three-quarters 25 to 26 fathoms; at 1 mile 40 to 50 fathoms; and thence the descent is rapid to the edge of the bank, distant one mile and nine-tenths.

In rounding the island it will be advisable not to near this point in less than 20 fathoms water.

At Ponta Torrais the coast runs to the southward, and the extreme point seen is Ponta d'Oueste, bearing S. 14° W., one mile and four-tenths. For about half this distance there is a beach of small shingle, and the high land comes down to it from the margin of the Caldeira, not in cliffs, but presenting an extremely steep declivity covered with shrubs and wild vegetation. As you approach Ponta d'Oueste this declivity near the sea assumes the appearance of loose earth cliffs, formed into one or two terraces as they have slipped down from time to time by the washing away of their base; and in front of these a narrow beach of large stones and shingle forms the actual coast line.

At this point the island has attained its western limit, and lofty cliffs characterise the remainder of the coast all the way to the north side of Pesqueiro-alto Point.

The bank of soundings along the shore last described is comparatively shallow and rocky to the extent of nearly half a mile from the land, where there are 15 fathoms. Outside that the quality of the bottom is generally fine sand, though rocky casts frequently occur. In the parallel of the Ponta d'Oueste at a quarter of a mile from the shore will be found 9 to 12 fathoms; at half a mile 25 fathoms; at three-quarters 35 to 40 fathoms; at 1 mile 44 to 49 fathoms; at $1\frac{1}{4}$ mile 55 fathoms; and thence it deepens rapidly to 200 fathoms at $1\frac{1}{4}$ mile off.

Nearly three-quarters of a mile south of Ponta d'Oueste is a small low detached rock named Ilheo de Mulher. It is about 50 yards from the beach at the base of the cliffs abreast of it, and has a few rocks above water close to it to seaward with 6 fathoms water almost alongside of them.

From Ilheo de Mulher, the coast (a narrow beach of stones with an occasional large rock on it) runs S. 27° E., 1.05 of a mile to the Sugar Loaf Rock, a mass of land standing at the base of a bold cliffy point, beyond which

there is a small rocky cove almost surrounded by high cliffs, which appear to have once formed the southern extremity of the island.

From this Sugar Loaf Rock the coast runs S. 30° W., 0.45 of a mile to a bold basaltic bluff of a small elevation, and presents in that space a rugged outline of steep cliffs formed into coves, the inner parts of which are filled with large loose stones, the cliffs decreasing rapidly in elevation as they approach the point.

A low coast of very broken outline then succeeds, running first southward two-tenths of a mile, and then eastward nearly one-third of a mile to the meridian of the old horizontal mill on the little eminence near the church. It is fronted by innumerable rocks which project from the shore in narrow ridges of broken lava to an average distance of about 200 yards. In strong winds the sea rolls over these in enormous breakers; the danger is more limited, however, than it appears to be, since they do not extend under water, but are all visible at low tide and have 5 or 6 fathoms close up to them.

These reefs terminate about 130 yards west of the meridian of the mill, where the coast shows three bold basaltic little bluffs, steep-to. The best landing (which is only practicable in fine weather) is in a small cove on the west side of the most western of these bluffs; and it is advisable to lie off and wait for the assistance of a native boatman to pilot you into it. At the head of the cove is a small dilapidated breast-work designed for a battery, distinguished by a flag-staff; and on the beach near it a few fishing-boats are occasionally hauled up.

Immediately in front of the basaltic bluffs there is a space from 250 to 300 yards in length free from outlying rocks, but beyond this the cliffs gradually rise, trend to the north as far as the little bay, and stony beach before the village; and the coast again bristles with detached rocks above and under water, which extend out 200 yards from it.

A short distance to seaward of these rocks, the church bearing N. 31° W., distant about three-tenths of a mile, lie three patches of sunken rocks, on which will be found 3 and 4 fathoms water; they are steep-to, having 13 fathoms close beside them.

There are no dangerous rocks before the stony beach in front of the village, but the surf which usually plays upon it makes the cove to the westward of the mill a preferable landing-place generally.

In the parallel of the Sugar Loaf Rock, at the distance of a quarter of a mile, there will be found a depth of 11 fathoms; at half a mile 19 fathoms; at three-quarters 25 fathoms; at 1 mile 30 fathoms; at $1\frac{1}{4}$ mile 35 to 40 fathoms; and thence to $1\frac{1}{2}$ mile it deepens rapidly to the edge of soundings.

On the west side of Ponta de Pesqueiro-alto, off the black basaltic bluff, and close to the rocks that lie at its western extremity will be found 11 fathoms water; south-west of the bluff two-tenths of a mile 7 fathoms, and keeping on that bearing at one-quarter of a mile from it 10 fathoms; at half a mile 64 fathoms, rocks; and at less than a mile no bottom with 200 fathoms.

In the meridian of the same bluff the bottom is rocky and uneven, with 6 and 7 fathoms water close to the breaking rocks, which lie in front of it on that bearing; at half a mile off it 23 fathoms, and then it falls suddenly to deep water, the edge of soundings being within 1 mile of the shore. The same kind of rocky uneven bottom continues the characteristic feature of the bank quite round the low point, going off flat in some parts for about half a mile, and then dropping rapidly to deep water.

In the meridian of the church, at a quarter of a mile from the land, are 12 fathoms; at half a mile 38 fathoms; at three-quarters 55 fathoms; and at 1 mile no bottom with 200 fathoms: with the church bearing north-west, one-

quarter of a mile off shore are 13 fathoms just outside the 3 and 4 fathom patches above-mentioned; at half a mile 23 fathoms; at three-quarters 50 fathoms; and at 1 mile 150 fathoms.

With the church bearing due West, and continuing on its parallel at a quarter of a mile from the shore will be found 10 fathoms; at half a mile 14 fathoms; at three-quarters 20 fathoms; at 1 mile 23 fathoms; at $1\frac{1}{4}$ mile 60 fathoms; at $1\frac{1}{2}$ mile about 100 fathoms; at one mile and six-tenths no bottom with 200 fathoms.

The best anchorages are on the western side, between the parallels of the Ilheo de Mulher and the Sugar Loaf Rock, in 30 to 35 fathoms, fine brown sand, about 1 mile off shore; and on the eastern side in 25 to 30 fathoms, sandy bottom, about half a mile due East of Ponta de Casa.

These are the anchorages mentioned by Tofino, but we cannot advise the adoption of them, or of any others the island may afford, except as a matter of necessity.

It has no fuel to spare, no facilities for watering, nor indeed anything to offer which cannot be obtained more abundantly and conveniently at Flores; whilst from its size and form it affords little shelter from wind or sea.

The flood tide sets upon the island N. 30° E., and the ebb in the opposite direction, with a velocity at springs, under ordinary circumstances of about $1\frac{1}{4}$ mile per hour; and when the movement of the waters is in opposition to a gale of wind it occasions a very high confused sea as it sweeps over the rocky uneven bottom at the north and south points.

The interior of the island consists of a volcano which has not been in action since the discovery of the island. The crater, named Caldeira, is a deep oval basin, the edge or rim of which is formed by a narrow ridge of lava of very irregular outline, covered with deep spongy moss, long coarse grass, and heather. It is about 7,500 feet across from north to south, 4,500 from east to west, and $3\frac{1}{4}$ miles in circumference. The most elevated part of the Caldeira is on its south-west side, where it rises to the height of 2,548 feet. On the north some part of the ridge is about 2,200 feet high: the eastern and western margins are considerably lower, in some cases not exceeding 1,434 feet.

At the bottom of the basin, on its north side, there are two small lagoons separated from each by a narrow neck of land, from which a rocky point, crowned by a hill, extends north-east into the eastern lagoon. The western one, which is the largest piece of water, has a very similar point projecting into it from the same neck of land to the westward, and is embellished by three small islets tufted with shrubs. The surface of this lagoon, which is a few feet below the level of the eastern one, is 1,273 feet above the sea, and 1,275 feet below the highest peak on the margin of the Caldeira. To the southward of these lagoons there is a space of gently undulating land, covered with grass, on which some cattle and sheep were pastured. It is drained by a small brook on the south-west side of it, which conducts the waters in that direction into the western lagoon; on the eastern side by a small marsh and two or three little ponds, the waters of which are led off by a narrow artificial cutting into the eastern lagoon, and used as motive power for three or four rude and very diminutive grist mills.

On the north-western side of the Caldeira, some of the parts sloping to the south-east are cultivated with maize and potatoes. The easiest access to this once fearful, but now tranquil basin, is by a path leading over a gap in its eastern margin where the descent is gradual.

The summit, even in mid-summer, is so frequently capped with clouds,

that numerous small rills of water were running down the mountain in the month of August.

The greater part of the island is used for pasture, but there is a narrow belt of land extending from the top of the cliffs of its eastern coast towards the crater, that is enclosed, and laid out in fields and gardens. The part so occupied commences at the top of the high land immediately above the village, and terminates between Cabeça Negra and Point N.E., about $2\frac{1}{2}$ miles.

In this distance several ravines occur, and the scanty supply of fuel the island affords is obtained from the trees and shrubs growing upon their steep side.

The comparatively low land which forms the south-west extremity of Corvo, has all the appearance of having been added to the original island by some after irruption of lava. It comprises between 160 and 170 acres, divided into fields by low dry built stone walls, and is diligently cultivated with grain, flax, and potatoes, and various vegetables.

The village of Corvo stands upon the eastern side of the south point, on rising ground close to the coast, and contains between 160 and 170 houses, generally built of stone and thatched; though a few are roofed with tiles. There are no other habitations on the island; and these for the most part wear a dirty and uncomfortable appearance, rising above each other in rows on the side of the hill, and separated by filthy lanes, the resort of pigs and poultry.

At the southern limit of the village stands the parish church, a small stone building with a square tower and short spire, which being kept well white-washed, is a good sea-mark. About 250 yards, S.W. by W., from the church there is a little rocky hill crowned by an antique horizontal grist mill. The church tower and this mill are the most conspicuous objects on the point.

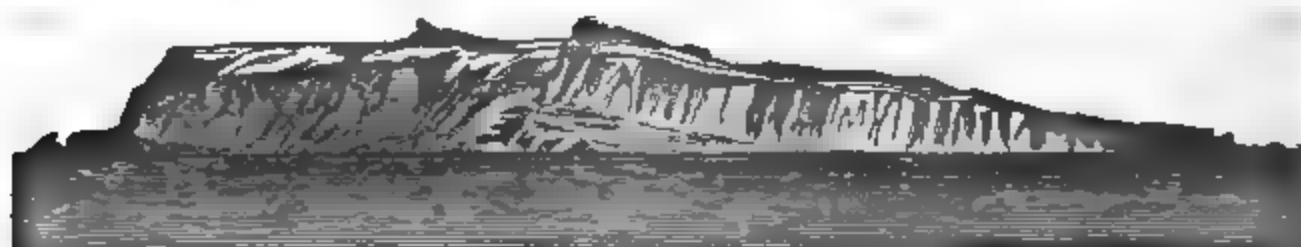
The population of Corvo, according to the official returns for 1843, amounted to 784 persons,—383 males and 401 females. But few supplies can be obtained here; wood is too scarce for export, and there are no conveniences at all for the supply of water."

FLORES.—This island is to the southward of Corvo, and is about 9 miles long by 5 miles broad. It is very mountainous, particularly in the southern part of the island; although the highest hill, named Moro Grande, is situated nearly in its centre, and is estimated to be 3,087 feet high. Between this island and Corvo there is no danger, it being deep water.

The north-west point of Flores, Point Albornas, is 270 feet high, of a red colour, and slopes gradually towards the sea; to the eastward of it, as far as Point Delgada, the coast is entirely surrounded with rocks, and affords no anchorage; the latter point is high level land, projecting but little, and having a cluster of islets at its base, extending a quarter of a mile out, with clear water around them. The north-east end of Flores is named Point Ruiva, near to which is the Islet of Azacar, or Sugar-loaf, and westward of it is anchorage in 25 fathoms, well sheltered from S.E. to S., and thence to W.S.W. Nearly 3 miles, S. $\frac{1}{2}$ E. from Point Ruiva is Santa Cruz Point, having the small island of Alvaro Rodriguez between, with anchorage to the S.E. of it, in 35 or 36 fathoms.

At three-quarters of a mile to the south of Point Santa Cruz is the castle, near to which is the town of the same name, and the principal port of the island. At $1\frac{1}{4}$ mile from the castle is Point Cabeira, which is low and rocky land, rising with a gentle acclivity to the distance of a mile. Between these points the coast forms a bay, having a beach and small river at the bottom of it. Here there is good anchorage in 35 to 40 fathoms, sandy ground, well *sheltered from all points between N.N.E. by the west, to S.W.* At $1\frac{1}{4}$ mile

S.W. $\frac{1}{2}$ W. from Cabeira Point is Lomba Point, between which is a bay where a vessel may anchor in 25 fathoms, but it is not so well sheltered as that just described, being open to easterly and southerly winds. Four miles farther on is Point Lagens, from which a ridge of rocks extends to the distance of $1\frac{1}{2}$ cable, S.S.E. In the bay, on the north side of this point, is situated the town of Lagens, having a large church, that serves as a useful mark for the coast; the anchorage is in 25 fathoms, sandy ground. At $2\frac{1}{2}$ miles S. $\frac{1}{2}$ W. from Lagens Point is a rock of $4\frac{1}{2}$ fathoms, named Escolar, which appears like a large flagstone when near it: the water around it is very deep, as well as the channel between it and the shore. The coast increases in height to the westward of Lagens Point, as far as Rocha Alta, to the north of which the land is very lofty, the hills having an elevation of upwards of 200 feet.



Ilheos Point.
N.W.

Flores Island, from the Escolar Sunken Rock.

Lagens Point.
E.N.E. $\frac{1}{2}$ E.

Between Rocha Alta and Point Ilheos, the S.W. extremity of the island, there is anchoring ground in 25 fathoms, sandy bottom, at a short distance from the shore. Point Ilheos is low and rocky, having several islets near its base; at more than a mile to the northward is Point Catarinhas, distinguished also by some small islets; and $1\frac{1}{2}$ mile farther is Point Bredos, a high sloping land, of a whitish appearance, near to which is an islet in the form of a column, with others near it; between the last named point and the former, there is anchorage in 20 to 25 fathoms, sandy bottom. Between Point Baxio, or Shoal Point, which is $2\frac{1}{2}$ miles to the northward, and Point Bredos, a vessel may anchor in 30 fathoms, and lie well sheltered towards the N.N.E., East, and South. Baxio Point is distinguished by the remarkable Church of St. Pedro, or St. Peter, on its summit. Point Fanaes lies $2\frac{1}{2}$ miles in a N.N.E. direction from Point Baxio, having the appearance of a mountain of a black colour. The bay between is that of San Pedro, which has anchorage in 24 to 30 fathoms, sandy ground, and where abundance of fresh water may easily be procured from a cascade which falls from the mountains. Nearly N.W. $\frac{1}{2}$ W. from Point Fanaes is Monchique Islet, which is 110 feet high, and separated from the shore by a deep channel, although near the shore there is a rock named Baxio Raza; farther on towards Albornas Point, already described, is that of Maria Gadella, a high round islet, having anchorage W. $\frac{1}{2}$ N. from it in 30 to 40 fathoms, sandy bottom.

The following remarks on the Bay of Fanaes are by Mr. E. May, of H.M.S. Skylark, "At daylight we bore up for the Bay of Fanaes, and at 5h. 30m. shortened sail and sent a boat for water. Found a great surf on the beach, which consists of large stones, none smaller than a man's head. These stones extend from the beach two or three boats' lengths, making it dangerous for boats to land.

The best landing place is a passage between a point of rocks that lies to the south of the beach; from thence you may procure water from a fountain, about half a mile from the beach, employing small casks, and at the rate of 8

to 5 tons per day by employing natives, if the weather is fine, and the wind between S.S.E. and N.E. With any other wind, particularly if blowing hard, there would be too much surf, and the passage too narrow in such weather to enter. This place may be known by a very high and steep mountain, a little to the left of the landing place, from whence the Island Monchique bears N.W., $1\frac{1}{2}$ mile. Between this island and the shore is a clear passage for ships, but they should borrow towards the rock, as a reef projects about a cable's length from them, although there are no hidden dangers in the passage.

At this place, by the assistance of shore boats, about 4 tons of water were obtained in 10 hours. The place abounds in poultry, sheep, pigs, vegetables of all kinds, and eggs, all very cheap, and were freely exchanged, by the natives, for old clothes. Those who came off to the ship were well dressed, clean, healthy people. The shore of the island is bold, and may be approached to the distance of a quarter of a mile. When leaving Fanaes, I would recommend vessels to run due West, for 2 or 3 miles, to get clear of the high land to the northward of the landing place, by which they would avoid being becalmed under this land when the wind is from N.E. to S.E., and would be enabled to run clear of the island. The Island of Corvo has also a bold shore, and can be seen off deck 55 miles distant, as was proved by us the day after leaving the island, both by log and observation."

FAYAL—This island is about $7\frac{1}{2}$ miles in extent, and is very mountainous, its interior consisting almost wholly of a volcano 3351 feet above the sea; there are also other hills scattered over its surface, many of which are more than 1000 feet high. The principal products of the island are wheat, maize, and wine; but the latter is only in small quantities. The number of inhabitants are estimated as under 20,000.

The chief town of the island is Horta, which is situated near the S.E. point of the island, where stands the hermitage of Nuestra Senora de la Guia, to the west of which is the small sandy cove of Port Pim, in which small vessels often load and discharge in fine weather, as it is well sheltered, except from the S.W. direction. At $1\frac{1}{2}$ mile N.E. $\frac{1}{4}$ E. from La Guia, is the northern point of Horta Bay, named Espalamaca; and there commences a beach of black sand, which terminates at Mount Queimada. Horta is distinguished by two remarkable buildings, which bear in a line nearly N.N.W.; one of them is named the Company's College, and stands near the sea side; the other, the Carmelite Convent, is situate in the west end of the town. The safest anchorage here is to bring the former building a little to the southward of the latter, with Point Joao Diaz (hereafter noticed) open a little to the right of Point Espalamaca; you will then be distant about a mile and a quarter from the town, in 35 to 40 fathoms, bottom of sand. The more general anchorage, however, in fine weather, is nearer the town, in 25 fathoms, with the buildings in the same direction; or for smaller vessels farther in, to 20, 18, 16, and 15 fathoms. This anchorage, although perhaps the best in the Azores, is, notwithstanding, much exposed both from the North to N.E., and S.E. to S.W., and winds from those quarters are often frequent in winter; that from the S.E. blows right in, and is often destructive, it is therefore advisable to be always ready for a start when occasion requires.

There is a shoal of 4 fathoms, lying nearly in mid-channel, between Fayal and Pico, which extends in a N.E. and S.W. direction, about 20 fathoms, and is about 10 fathoms broad; it lies with the college and convent in one, Point Espalamaca bearing N. by E., and La Guia Hermitage N.W. $\frac{1}{4}$ N. Vessels coming from the S.W. sail between it and the latter, or should *circumstances require it, the channel to the eastward, or between the shoal and*

Pico, is equally safe. In approaching the road from the S.W., should the wind be dying away from the eastward, and you intend to tack to gain the anchorage, keep within $1\frac{1}{4}$ mile towards Pico, for farther out the bottom is rocky and will prevent your anchoring, should you require to do so; you will also thus be free of the variable eddy winds and calms, caused by the neighbouring mountains.

Espalamaca is a high sloping point, having a small round front, with a vigia, or look-out, on its summit; about seven-eighths of a mile to the northward, is Point Joao Diaz, which is low, black, and rocky, with some rocks at its extremity; the coast between is indented, and has a beach with a church at the bottom of it, where vessels from Port Magdalena, on the opposite side, sometimes take shelter during violent gales from the southward. About $2\frac{1}{4}$ miles, N.E. by N., from Joao Diaz is the N.E. point of Fayal, named Ribeirinha, which is high and sloping, forming a round front of half a mile; at its extremity there is a low point with three small islets: the coast between Joao Diaz and Ribeirinha forms a slender bay; the land is high and oblique, and presents, near the middle, a remarkable slope of a red colour, which may be seen from the mid-channel shoal.

The northern point of Fayal is named Cedros Point, and presents a high sloping appearance. On the west side of the island are the Capellinhas, two islets separated from the coast by a narrow channel, through which fishing-boats may pass in fine weather. The S.W. extremity of Fayal is Point Castello Branco, which appears like an island at a distance, being sloped on all sides; the coast hereabout is rocky to Santa Catalina, which is a low black point, having a hermitage on it; between it and Guia Point, distant $3\frac{1}{4}$ miles, is the cove of Feteiras, where there is a small village and several islets.

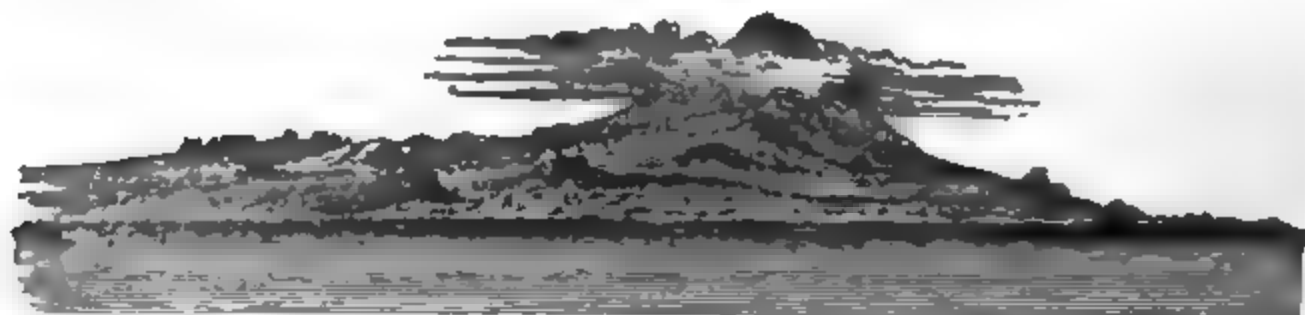
With respect to Fayal it may farther be observed, that, although the peak on the adjacent island is a conspicuous object, and may be seen, as we have already noticed, at a very considerable distance, yet, it is not always to be depended upon, being hidden for days successively, in cloudy weather.

PICO.—This island is about 25 miles long, from east to west, and about 8 miles broad at its widest part, where is situated the peak from which it derives its name. The island is volcanic, as are all the islands of the Azores group, and over its surface are scattered many extinct volcanos; but principally in its eastern division. The peak from whatever point viewed has the form of a sugar-loaf, and its height, according to the last English survey is 7,618 feet. It can be seen 24 or 25 leagues off; but is frequently so obscured by clouds, as not to be seen at any considerable distance.

Little grain is produced on the island, the soil being stony, so that most of the wheat and maize, for consumption, is imported from the neighbouring islands. Wine is the staple commodity, and is reputed the best in the

Cabana Brabo.

O Pico 7618 feet.



Candelaria.

St. Matthew's Point.

Pico Island, the Peak bearing E. by S. $\frac{1}{2}$ S., distant $8\frac{1}{4}$ miles.

Azores; this, with brandy, is exported in considerable quantities. The island contains numerous, and excellent cattle; with abundance of fruit and timber.

The south-west and west coasts of Pico are rocky, and distinguished by several rocky islets; towards the N.W. extremity are the Magdalena Islands, surrounded by rocks, with 6 to 8 fathoms water near them; here there is a small port and town, where the chief business between the island and Fayal is carried on. Farther to the N.E. is Baixio Grande Point, from whence breakers extend nearly a league in a gale; from this point, to the east end of the island, the coast is so rugged as to be almost inaccessible. Ponta da Ilha is the S.E. extremity of the island; it is low and sloping, having a ridge extending to the eastward nearly a cable's length: from hence to the westward, the coast continues rocky to Point Arrife, which is distant nearly 10 miles; $2\frac{1}{2}$ miles farther is the town and lagoon of Lagens, which are joined to the sea by means of a bar, over which coasters pass at high water. Five miles and a half from Lagens is Point Catalina; N.E. of which there is a place of shelter for fishermen.

SAN JORGE OR ST. GEORGE.—This is a long narrow island lying to the north-eastward of Pico, about 10 miles. It is nearly 30 miles in length, while its average breadth does not exceed $2\frac{1}{2}$ miles. Over its surface are many extinct volcanoes, some of which are nearly 3,000 feet high.

The highest mountain is situated in the centre of the island, and is 3498 feet high; its name is Pico da Esperanza. Wood and fresh water can be obtained here, and supplies of almost every description in abundance.

The western point of the island, Point Rosales, is of moderate height, and has two pyramidal rocks off it, one at the foot of the point, and the other half a mile S.W. from it; some other islets lie interspersed about it, and a rocky shoal of 7 fathoms is said to lie S.W. of the same point. From hence the coast trends S.E. by S. to the Morro Grande, or High Hill, situate near the town of Vellas, which has a port well sheltered for small vessels; to the N.W. of the Morro there is an indent of the coast, which has sometimes been taken for the port, and has, in consequence, proved fatal to many; when here the bottom is all rocky, and a vessel once in cannot leave, without a change of wind.

Point la Queimaida is a low point with a small castle, distant about $1\frac{1}{2}$ mile from the Morro Grande, which is distinguished by a vigia, or look-out, on its summit; between the two points is the port of Vellas, which, as we have just stated, is well sheltered from most winds. The town is situated at the bottom of the bay, and has a small mole on the S.E. side, within which are 3 fathoms rocky ground; the common anchorage is therefore in 9 fathoms, sandy bottom, south of the mole, moored with two anchors N.W. and S.E. To the eastward of Queimaida Point the coast continues low and rocky all the way to Point Pontinha, the south extremity of the island; in the interval between, about 4 leagues from Vellas, is the point and town of Calheta, where a high mountain rises, and indeed the land in the interior is generally of moderate height, although the coast is low. The easternmost point of the island is named Topo, around which, as well as the islet to the eastward of it, are numerous rocks.

From Point Topo, along the north coast of the island, to Point del Norte Grande, the coast presents nothing remarkable, but has a low, regular appearance; from the latter point, however, to that of Rosales it is more rugged and barren.

GRACIOSA.—This island is about $8\frac{1}{2}$ miles in extent; but, although so *limited, it produces barley, wheat, maize, wine, fruit, and vegetables in great*

abundance. Its highest mountain, named Caldeira, is 1349 in height, and is situated in the eastern division of the island. The chief town of the island, Santa Cruz, is situated on the N.E. coast, and has near it three small hills, which are good marks for this side of the island.

When approaching Graciosa from the south-westward the mountains appear isolated, particularly those over Carapacho and Branea Points, which are of considerable elevation, and can be seen at a great distance from seaward. Point Carapacho is the S.E. point of the island; it is of moderate height, and has several rocks about it, particularly one at two cables' length off, named Baxo. This rock is of small extent, and has a depth of 14 to 18 fathoms between it and the shore, through which vessels may pass, but it is not recommended, the safest passage being to the eastward of the rock.

At $1\frac{1}{2}$ mile N.E. $\frac{1}{4}$ N. from Point Carapacho is Fanais Point, which is moderately elevated, and has two rocks at its foot above the water. From hence to Point Negra, the north point of Praya Bay, the distance is about $1\frac{1}{2}$ mile; this point is low and rounded, and its cliffs are but of moderate height. Praya Bay is but a slight indentation of the coast, and is rocky in every part, excepting immediately before the village, where there is a sandy strand. Behind the village is a stream of lava which has descended from the mountains in former times. In this bay the soundings are from 7 to 10 fathoms.

At about half a mile to the eastward of Praya is the small islet of the same name, which is surrounded by a reef of rocks. It is of but moderate height, being highest at its north-east end. When passing between the island and the shore, keep Fanais Point in one with Ponta de l'Este, and it will carry you through in mid-channel.

From Point Negra to Point Santa Catharina the coast runs to the northward about $1\frac{1}{2}$ mile, and is very regular and steep. At half a mile beyond this latter point is Point Ferreira or Josef Ferrer, which is low, and has a dangerous bank extending from it to the north-eastward about one-third of a mile, some parts of which are above the water; outside this bank the depths are 7 to 15 fathoms. Immediately round Point Ferreira on the west side is the village of Santa Cruz.

The village of Santa Cruz is built in a small bay on the north side of the island. It is of some considerable extent, but its anchorage is not frequented, being too much exposed to the northward. The best anchorage about the island is with the Islet Baxo, near the S.E. point, in a line with the westernmost part of Praya Isle, or, rather a little open; this is off the southern extremity of a great slope of land, extending toward Point Ferreira. The depths are from 30 to 40 fathoms, sandy bottom, but the shelter is only from South by the west to nearly North, it being exposed in all other directions.

From Point Ferreira the coast runs to the N.W. about $1\frac{1}{2}$ mile to Point Vermelha, which is surrounded by rocks; from hence it follows nearly the same direction and distance to Point Pico Negro, the north point of the island. This point is high, oblique, and of nearly a black colour, and has some rocky islets off it. The coast hence to the south-westward to Pta de Fozo do Porto continues high and rocky, and has some dangers off it at a short distance. From this point, which is the western point of the island, the coast runs half a mile to Point Jorge Gomez, and is of moderate height, but the latter is low and rocky, and has a brook near it: while over it is Mount Vermelha of a conical shape, and being of considerable height, is easily recognised from seaward. From Point Gomez to Point Branca the coast is high and steep, and runs to the south-eastward about 3 miles; about midway is the small village of Esperanza. Near Point Branca is Mount Pedro Botelho, the highest

mountain in the island, which is estimated to be 1378 feet above the sea level.

At 2 miles S.E. $\frac{1}{4}$ S. from Point Branca is Point Fogo; the coast between bends inwards and forms a bay the shores of which are bordered with rocks. One of the rocks being larger than the other is named Forte Islet, and near it is the landing place. Near Point Fogo is the village of La Luz.

At Point Fogo there is a stream of water. From hence the coast trends to the E.S.E. $\frac{1}{4}$ S. about $2\frac{1}{4}$ miles to Point Carapacho, and is high and steep.

The bank of soundings surrounding Graciosa, extends on the east side of the island about 2 miles off; but on the north-west and west sides its extent is about $3\frac{1}{4}$ or 4 miles. It in general consists of sand, gravel, and shells, and the depth is more regular on the west than on the east side of the island.

TERCEIRA.—This is considered the principal island of the Azores, as it is the seat of government, and the residence of the civil and military authorities. The chief town of the island is Angra, on the south coast, where there is good shelter from all points, but from S.S.W. by south to East.

Terceira is about $16\frac{1}{4}$ miles in extent, from east to west, and 9 miles broad. Its form is that of an ellipse. The island is very fertile, and produces abundance of corn, wine, and fruits; the pasturage for cattle is also good, and wood and water can be obtained in plenty. Along its shores fish are plentiful, and of good quality. The number of inhabitants, according to the last census, was 29,000.

The coasts of the island are in general high and steep, so that the interior is accessible at only a few places, and these are frequently defended by batteries and fortifications. The interior is very lofty, some of the mountains being over 2000 feet, while the Caldeira de Sta. Barbara, in the western part of the island, is estimated to be 3500 feet above the sea level. The island is eminently volcanic, and scattered over its surface in almost every direction, are beds of lava, which have flowed from the mountains during periods of convulsion. The western side of the island is higher than the eastern, and the Caldeira de Sta. Barbara may be frequently recognised by a great break on its eastern side, which is seen from seaward at a short distance, or from the N.E.

ANGRA.—This town is easily recognised by Mount Brazil, a rocky peninsula, sheltering the bay from the westward, which is a steep hill, forked at the summit, having an elevation of 555 feet above the level of the sea. At the summit of the mountain are two lakes; also a tower; and at its foot are the strong forts of San Juan and San Antonio, which are a great defence to the town. On the N.E. side of the bay is also a fort, named San Sebastian. All these objects will serve to point out the situation of the bay; but it may be still farther known by the Cabras, or Goat Islands, which lie about 4 miles to the S.E. by E. of the mount. These are two rocky islets, the eastern one of which is higher and larger than the other, being about 480 feet high; they are separated from the shore by a channel about $6\frac{1}{4}$ cables' wide, in which are 15 to 20 fathoms water, and from each other by a narrow passage, in which are about 7 fathoms. The larger island is accessible only on its north side, being steep to the south and west; and when seen from the southward or westward it presents somewhat the appearance of a wedge. Close to all round these rocks is deep water of 8 to 30 fathoms.

Nearly 2 miles S.S.E. $\frac{1}{4}$ E. from the Cabras Rocks, are the Frades Islets, two dangerous islets, the highest of which is pyramidal in shape, and has many heads, which, at a distance, appear like islets. From the S.E. side of *them*, a shoal extends about a cable's length, over which the sea breaks. In *the immediate vicinity of these rocks* there are soundings of 10 to 50 fathoms,

and between them and the Cabras are 60 to 80 fathoms, gravelly bottom and clear ground.

About E. by S. $\frac{1}{2}$ S., $1\frac{1}{2}$ mile from the Frades is a rocky patch of 28 fathoms, which lies with the Pico de las Contiendas, bearing N. 11° W. (true), and the larger Cabras Islet W. 18° N. (true). To avoid it bring the south end of Cabras in one with the south extremity of Mount Brazil, and you will pass it to the northward.

In the anchorage of Angra there is plenty of room, and a depth of water of 9 to 20 fathoms. It is said that ships should moor in a line with the forts of Antonio and St. Sebastian; this is necessary as the anchorage is open to all winds, from S.S.W. by the south to East, and therefore unsafe when it blows from those quarters, particularly from the S.W., which causes a tremendous swell. Larger ships anchor to the eastward of Mount Brazil in 30 to 40 fathoms, sandy bottom; but it is necessary to be always ready to start in case of necessity.

On the west side of the fort of St. Sebastian is a sandy beach, named *Puerta da Pipas*, which is a place of shelter for small craft, in case they should be prevented by sea from landing at the mole.

Vessels approaching the Bay of Angra from the S.W., South, or S.E., should steer directly for Mount Brazil; and, with adverse winds, may tack boldly without the bay, as the water is sufficiently deep up to the shore: a calm, however, is to be dreaded, as the currents are strong and variable; we would not therefore recommend too near an approach under such circumstances, as it is an iron-bound coast, and a ship driven on it would be placed in extreme hazard.*

From the Bay of Angra the coast runs to the E.S.E., about $6\frac{1}{2}$ miles, to Point Contiendas, the south-east extremity of the island, and is high and bold with deep water a short distance off. This point is remarkable, being low and projecting somewhat into the sea, and has on its summit three hills, the western one of which, is named *Pico da Mina*, and the eastern one *Pico de las Contiendas*; both these are of equal height (493 feet), and serve as good marks by which to recognise the point.

At about one-third of a mile north of Point Contiendas is Point Mina, having off it 4 islets close to the shore; and $3\frac{1}{2}$ miles north of this is Point San Jorge, which is low and rocky, and surmounted by a battery. On the summit of Point San Jorge is the *Pico do Capito*, 487 feet high; and 2 miles south of it is a small place, named *Novo*, where boats may land.

Praya Bay.—To the northward of Point San Jorge, about 2 miles, is *Malmerendo Point*, which is high, rocky, and steep, and has at its foot some breakers, and a rock which covers with the tide. Between these points is the Bay of *Praya*, which is considered to contain the best and safest anchorage in the Azores, its only disadvantage being that it is open to easterly winds. The extent of the bay is about 2 miles, and at its head is a large and populous town, which is well defended by batteries. The shores of the bay are low and sandy, and the soundings average from 8 to 10 fathoms, on a bottom of sand, shoaling gradually as you approach the town.

* In 1851, notice was given, that a white triangular flag would be hoisted at the battery on Point San Antonio, Mount Brazil, whenever it is considered imprudent for vessels to anchor. Should a vessel not pay attention to this signal, the commander of the battery is authorised to fire with blank cartridge, which will be repeated at reasonable intervals, in case no attention is paid to it, the expense of such to be borne by the master of the ship. In the event of necessity compelling you to run into the port in order to beach, or should any untoward circumstance, or disaster have happened on board, then the national colours must be hoisted in the rigging, which will be a guide for the officer in command not to fire.

A good mark for approaching the bay, when at a great distance off, and the high lands are not hidden by the clouds, is the chain of mountains in the interior, named Pico Norte and Pico Agudo, which are of the respective elevations of 2685 and 2650 feet above the level of the sea. The southern part of this chain is nearly on the meridian of the bay, and bears from it about W.N.W. $\frac{1}{4}$ N.

The best anchorage in Praya Bay is with Point Malmerendo in one with Carneiros Island, situated 3 miles to the northward of the point. Here you will be in about 20 fathoms, and may ride with the two towns at the bottom of the bay in one; or east of the steeple of Santa Cruz, which is the highest in the town, with the town bearing about N.W. In fine weather, from June to September, you may anchor still nearer the town, in 8 to 10 fathoms, as winds are not then so strong, and blow generally from the westward. When landing, it is not recommended to attempt it in the south part of the bay, because a bank lines the shore, and would put you to great inconvenience; the best landing place is consequently at the town.

At Port Praya it is high water at about 12h. 35m. on the days of full and change, with a rise of tide of about 4 feet. Here refreshments of every description can be obtained, and wood and water in plenty.

Upon the parallel of Praya Bay the bank of soundings extends outwards about 7 miles. In a depth of 226 fathoms, which will be found at this distance, the ground is generally of rock, but these soundings are not maintained long, as the depth immediately decreases to 90 fathoms, and then gradually diminishes to the entrance of the bay. The bottom is generally of sand, although occasionally rocky ground is met with; and the depth at 3 miles from the town is 70 fathoms; at $1\frac{1}{4}$ mile 35 fathoms; and at 1 mile 20 fathoms.

At 3 miles to the northward of Malmerendo Point is a small islet 62 feet high, named Carneiros, which is very steep, and separated from the shore by a channel half a mile wide, in which are soundings of 17 to 20 fathoms. Ships may pass through this passage as there is no danger except a small rock a little north of Point Carneiros, and very near the coast.

The *North and West Coasts* of Terceira being steep and quite inaccessible, it is unnecessary to add a description here; suffice it to say that there is no place of shelter or anchorage, and that generally deep water is found close to the shores. At nearly 2 miles N.W. by N. from Point Serreta, the west point of the island, are two patches of $4\frac{1}{2}$ fathoms, with 15 to 30 fathoms close to them, deepening rapidly to 80 and 100 fathoms. They lie with Point Serreta in one with the middle of the summit of the Caldeira de Santa Barbara, and you will have passed them to the southward when Pico Nigrao is in one with the extremity of the point; and to the northward, when the same hill is in one with Negrita Point, or with the middle of the summit of Caldeira. Between these patches and the shore there is a good channel of 30 to 60 fathoms water, but it is safer always to pass outside.

Between Terceira and San Miguel a rock was reported in 1850, and attempts were made to discover it, but without success, no bottom having been found at the depths of 200 and 300 fathoms.

SAN MIGUEL, OR ST. MICHAEL.—This island, although not the seat of government, yet is the most important, commercially, of any of the Azores group of islands. It is about 35 miles long, by $7\frac{1}{4}$ miles wide, in its broadest part, which is at its eastern end, and has somewhat of a rounded form, the bend being to the southward.

The chief town, Ponta Delgada, is on the west side of a small bay on the south side of the island, and is situated in lat. $37^{\circ} 45'$ N., and long. $35^{\circ} 40'$

W. It is not very extensive, but possesses some good public buildings, and many conveniences for shipping.

There is a mole for the protection of small vessels, and it has lately been proposed to build some docks, at a cost of £150,000, but whether the idea will be carried out remains to be seen, as the private capitalists of the island did not seem willing to encourage it.

San Miguel is undoubtedly volcanic, and presents a great variety of appearances as it is passed from east to west. The east end rises from a bluff sea-cliff of between 1200 and 1400 feet elevation to a lofty inland peak, from which a central range, varying in height between 2000 and 2500 feet, runs to the westward, terminating in the Serra da Agoa de Pao, 3070 above the sea. The sea-coast gradually declines in approaching the east point, where it is not more than about 100 feet high. The part next seen is lower, and its outline, as presented by the summits of numerous volcanic monticules of about 1800 feet elevation, is united in a central ridge more indulating; the western extremity being marked by the conspicuous Serra Gorda, 1570 feet above the sea; its shores on both sides are low, broken, and rocky. Of the remaining part the aspect is that of a vast truncated cone, irregularly cut off, at an elevation of about 1800 feet, and falling on the N., W., and S. sides to a perpendicular coast of between 300 and 800 feet high. The outline is varied by the intervention of peaks, thrown up on the summit and flanks, and round the foot of the mountain, some of which are of considerable elevation.

In the higher parts of the island the surface is generally covered with an undergrowth of heaths, cedar, laurel, laurestinus, and other evergreen shrubs which give the mountains an exceedingly rich and wooded appearance, notwithstanding the inroads of cultivation and the more destructive demand for fuel. Like all volcanic countries, the face of the island is uneven and irregular, being deeply excavated by numerous ravines, and roughened by streams of semi-vitrified and scoriaceous lava that resist all atmospheric influences and repel vegetation. Heavy rains falling on the mountains afford a constant supply of water to four lakes at the bottom of extinct craters or subsidences, and a number of minor reservoirs, and through them to small streams rapidly running down on all sides into the sea.

The rich level country of the island is well adapted for the growth of wheat, Indian corn, and beans, or callivances. The vine and orange are cultivated in the lava districts, and yield abundance of fruit. The lava in the south-eastern region of the island is generally understood to be older, softer and to become more speedily fertile than that of the north-western region; and this latter preserves such a degree of hardness as to be, in several places, incapable of yielding to the industry of man. The surface in the intermediate parts, between the volcanic lands and the level country displays volcanic sand, metallic slag, pumice-stone, &c.

The wild animals peculiar to the island are the rabbit, ferret, weasel, rat, mouse, and bat; to which may be added the frog, which was introduced a few years ago by a landed proprietor, and now inhabits every pool. The fish are mostly the same as those of Madeira. The birds permanently belonging to the island are the buzzard, which gives its name to the "Accres," little owl (*strix passerina*), starling, blackbird, chaffinch, mountain finch, canary finch, yellow wagtail redbreast, black cap, willow wren, golden-crested wren, wood-pigeon, rock pigeon, red-legged partridge, quail sanderling, green sandpiper, sandwich tern, herring-gull, common gull, and stormy petrel. In addition to these, of which some are rare, others common, the following are occasional visitants;—the swallow, eagle-owl, raven, crow, pied woodpecker, hoopoe, bullfinch, goldfinch, heron, crane, bittern, spoonbill, curlew, wood-

cock, snipe, kingfisher, water-rail, coot, puffin, wild swan, widgeon, and teal.

Although the climate is variable both in heat and humidity, it is of the most temperate kind, and the changes do not materially affect health, personal comfort, or the operations of out-door business. As in summer it is seldom that clouds do not float in the atmosphere to offer an occasional mitigation of the sun's heat, so in winter there are few days when this is not felt, and during the whole year there is not one of necessary total suspension of agricultural labour.

Of the winds it may be said that there is no regular characteristic except a prevalence at times from the N.E. or N.W., and the ordinary change from a S.W. gale to a moderate N.W. breeze. The latter circumstance is well known to mariners of the trade, and taken advantage of by them in returning to port after having been compelled to go to sea by a gale of wind from seaward. During the five years, from 1839 to 1844, there was a mean number of 9 calm days, and the following number, omitting fractions, of each wind:—N. 27; N.E. 110; E. 20; S.E. 40; S. 17; S.W. 51; W. 20; N.W. 71; indicating that the island is removed from that part of the Atlantic where westerly winds generally prevail, and has a preponderance in the ratio of 37 to 26 of northerly and easterly over those from other points of the compass. Storms are not frequent or generally of long duration, but they are heavy while they last. They have been found by observations, carefully registered on five of the islands, to possess a decidedly rotatory character (interfered with, however, by the great altitude of Pico), but not a regular course of progression. Some tend to the S.E., others to the N.E.; none appear to pass to the westward or to range from due E. more than between N.N.E., S.S.E., and S.W. gales, the most formidable in an open port of southern exposure, shift as has been stated, generally to the N.W., and moderate at that point, proving that they have a south-easterly course, their centres passing to the northward of the island. With respect to the mean force of winds, it appears to be distributed as follows:—N. and E. less than four of the table of forces used in the Royal Navy; W. 4; N.E. and S.E. more than 4; S. and N.W. $4\frac{1}{2}$; S.W. nearly 5. Of the summer months the average force is little more than 3; of the winter under $5\frac{1}{2}$. Observations having been made to ascertain how far the state of the sea prevents communication with the shore at Ponta Delgada during the year, it results that these are 50 days of interruption; 41 in winter, and 9 in the summer half-year.

The number of inhabitants, by the last census of 1840, was 80,809, of whom 41,711 were females. The people are said to be generally industrious, sober, frugal, and, with an exception common in southern climates, cleanly in their persons. Their address is mild and engaging, but they are of passionate temper and vindictive disposition; and, notwithstanding the familiarity of salutations, naturally distrustful of each other, and deficient in real cordiality of feeling. In domestic life they are harsh and cruel; men beating their wives, and mothers their children, with the greatest ferocity. Their moral character is also at a low standard, whether as regards truth, honesty, or chastity; nor in any class are breaches of these virtues sufficiently reprobated to correct the popular neglect of them. As if sensible of their dangerous propensities, it is said they never live in retired situations at a distance from the protection of their neighbours, but construct their habitations in villages, where they can at all times command assistance.

The western point of San Miguel is Point Ferraria, which is high and *steep, and has on its summit a hill named the Peak of Camarinhas, which is 687 feet high. From the base of the point, a point of lower elevation and*

bordered with a reef runs to the N.W. about one-third of a mile, and causes breakers sometimes to a considerable distance. Upon the reef there are several rocks above water, and close to its edge are soundings of 10 to 20 fathoms. At about a mile northward of the point is a small patch of 15 fathoms, the site of the island of Sabrina, which was thrown up on the 11th of June, 1811, and shortly after became submerged; it has soundings of 30 fathoms close to it on the western side and between it and the shore 17 and 15 fathoms.

At $2\frac{1}{4}$ miles to the southward of Ferraria Point is that of Candelaria, having near it a rock upon which the sea breaks. From hence the coast runs to the S.S.E. $9\frac{1}{4}$ miles to Point Delgada, and is high, abrupt, and rocky, with some detached rocks off its projecting parts.

Bay of Ponta Delgada.—To the eastward of Point Delgada is the Bay of Ponta Delgada, which contains the principal town of the island, and is entirely exposed to the southward, being protected only from the winds which blow off the land. The soundings at $1\frac{1}{4}$ mile off the shore are about 40 and 60 fathoms, thence gradually decreasing to 10 and 8 fathoms; and the bottom is of sand; while outside this depth of 40 and 60 fathoms, the bank of soundings is soon lost, there being no ground at the depth of 200 fathoms.

The town of Ponta Delgada is protected by batteries, and well built, the houses and streets standing on a gentle declivity. There are a college, several convents, and a custom-house, and the various public buildings are represented to be commodious and to have some pretension to elegance. At $1\frac{1}{4}$ cable's length from Point San Pedro are two rocks, which must be carefully avoided; they stand within the 5 fathoms line.

There is no difficulty in taking the anchorage here; but the best, because it is suitable for all winds, is at about a mile from the town, in a depth of about 40 fathoms, on a bottom of sand. You may also anchor nearer to the town in 17 to 10 fathoms, at a half to a quarter of a mile from Point San Pedro; but it must only be in fine weather. Should you be compelled by a southerly gale to quit this anchorage, it will be best to round the western end of the island, and await a shift of wind from the N.W., which usually succeeds a S.W. wind. Thus the roadstead may be easily regained; but, should you run to the south-eastward, it may be ten days, or more, before you can beat back to the road as the current frequently sets to the S.E. In beating up, keep close in shore, only avoiding some rocks which lie near Point Galera.*

There have been five buoys lately moored in this anchorage, which will considerably reduce the risk of vessels leaving their anchors and chains behind them when they leave the road; and, signals also have been established, which are made from the flag-staff on the Custom-house Quay, in the following manner:—

A red flag.—Vessels must weigh anchor on account of the weather.

A white flag.—Vessels in sight may make for the anchorage.

A red flag with a white border.—Boats must not be sent on shore the landing being dangerous.

From Point San Pedro the coast runs $1\frac{1}{4}$ mile to the eastward to Point Rosto do Cao, and is rocky and broken; on this point is a small hill. From thence it runs $2\frac{1}{4}$ miles to Point Alagoa, and is of but moderate height, with some rocks close-to, to the eastward of which is a small cove named Carneyros, and near it the village of Alagoa. It now turns to the S.S.E. 3 miles to

* In 1846 an order was issued by the Governor of San Miguel, directing that a signal gun should be fired, upon any ship approaching the roadstead without hoisting her national flag;—the master to pay the expense of the same.

Point Agoa, and is clear all the way. On the east side of this latter point is Port Cabassos, which is merely an open cove suitable for boats, with the village of Agoa do Pao at its head, where there is landing near the stream. Point Galera forms the east side of Port Cabassos, and is rocky and abrupt, with rocks standing some distance out; on the summit of the point is a small hill.

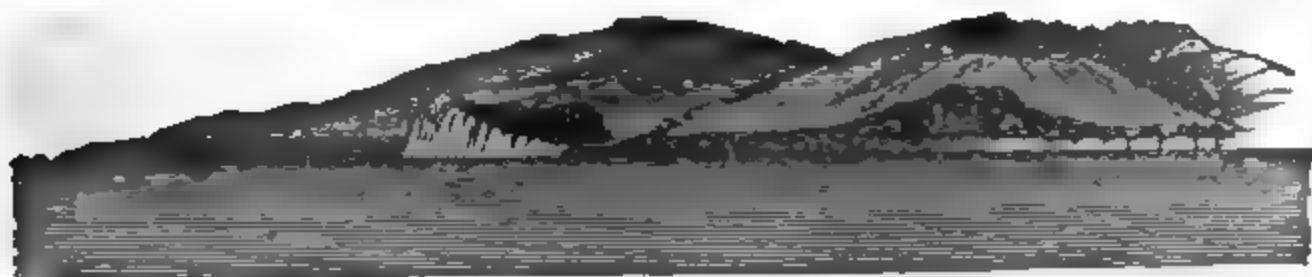
From Point Galera the coast is high and bold, and runs $2\frac{1}{2}$ miles to Point Pyramida which has a reef extending from it about a quarter of a mile, and a rock awash with the surface of the water near it, so that a close approach must not be made. From hence to Villa Franca, the distance is $1\frac{1}{2}$ mile.

Villa Franca is a small village close to the shore side, built on land of a moderate height. Near it is a stream of fresh water, having on its east side a rocky point named Arca, from which a reef runs out about 2 cable's length. From Arca Point the coast runs nearly 3 miles to Point Garca, and is high and bold close-to.

Off Villa Franca is a remarkable volcanic rock about 80 feet high, named the Ilheo, which has a circular basin in its centre, the entrance to which faces the town. This basin is not very extensive, but the depth is sufficient to admit small vessels to careen, or for purposes of shelter. From recent observations it would seem that it is becoming filled up with sand.

Serro da
Agoa de Pao.

Lagoa
do Fogo.



Galera Point.

Villa Franca Island.

Villa Franca.

The channel between Ilheo da Villa Franca and the shore is of the width of three cables' length, and here is the principal anchorage. The depth is from 4 to 10 fathoms, sandy bottom, and vessels moor North and South, with a hawser on shore, on to the islet; but the latter, owing to its diminutive size, does not shelter a vessel from the wind and sea, between E.S.E. by south, to S.S.W.

From Villa Franca to Point Retorta, the east end of the island, the distance is 13 miles; the coast maintains its elevated character, and has no dangers but what are close to the shore. Point Retorta is bold, very elevated, and of a rounded form, with some rocks close to its base, and has over it a high mountain, named Pico de Nunez, of the estimated height of 2220 feet.

East side.—The coast on the east side of the island is all high and bold, with 6 to 8 fathoms a short distance off. About five miles from Retorta Point is Arnel Point and the hamlet of Nazarete, before which small vessels can anchor but the shelter is indifferent and the ground bad.

North side.—The north side is in general high and bold, and affords no place of shelter whatever, being entirely exposed to the northward. At about $2\frac{1}{2}$ miles to the north-eastward of Ferraria Point, is the little harbour of Mosteiros, with some remarkable islets near it; the largest of which is high, *sloped, and smooth at its summit*, with an aperture, through which the sea

passes, from one side to the other. Point Mosteiros has some reefs about it; between it and Point Bretanha is the Bay of Joao Bom, in the vicinity of which the coast is high and rocky, and is further distinguished by a sharp pointed hill named the Pico da Maffa. From hence 13 miles will bring us to Ribeira Grande, a large town, but there is no anchorage, or harbour, nor even landing, except when the sea is very smooth.* From hence to the N.E. extremity of the island, Point Riveira, there is no place of consequence, and the coast is all high and bold, with soundings extending 2 miles from the shore.

It may be remarked, generally, that the coasts of San Miguel or St. Michael, are all bold, and may be approached without fear, as all the dangers lie within a furlong of the shore, with the exception of those half a mile from the bay of Mosteiros, and those already noticed. When approaching from the westward, the N.W. end of the island has an unpromising appearance, as it presents but barren mountains of stupendous bulk, with a steep barren coast, surmounted by a few trees of slender growth. If approaching from the eastward, for Ponta Delgada, take care to give Point Galera a good offing, not only on account of the rocks, which have before been mentioned, but because the high land behind often occasions a calm thereabout. During the winter months heavy squalls are often frequent, from S.W. to N.W., more particularly from the latter quarter.

SANTA MARIA or ST MARY.—The island of St. Mary is about 7 miles in its greatest, and 5 miles in its smallest diameter, and contains an area of 36 square miles, or about 27,000 English acres. It has nearly in the centre the double-peaked mountain of Pico Alto, 1870 feet in height, which falls on the east and west sides to a shelving base of about a mile in breadth, and 850 feet above the sea. To the N. and S. it throws out a range of undulating heights, which terminate at the sea in lofty mural cliffs of more than 200 feet in elevation. The E. side of this range is covered with hills, diminishing in altitude as they recede from the centre, and intersected by numerous gorges of increasing width and depth, the channels by which the heavy rains of winter reach their points of discharge. The west side is a slightly inclining and undulating plain, also cut by ravines, terminating in cliffs more than 100 feet high. The aspect of St. Mary is therefore on all sides perfectly bold; the central peak distinct, the subordinate range high and of varied outline, and the coast abrupt, precipitous, and based by the usual accumulation of fallen masses.

The surface on the west side is much overlaid with stones, and bears a spare vegetation of the grasses and weeds of argillaceous soils; the central range is covered with the common heath, myrtle, and arbutus of the Azores, and the east side is occupied, for the most part, with the agricultural produce of the island. Of trees, there are a few in small plantations, and there is an increasing inclination to extend the culture of the orange; but the shrubs of

* It having been represented that the bottom on the north side of St. Michael is foul in the anchoring depths, and that no vessel would be likely to recover her anchor if she brought up there, I thought it my duty to take the earliest opportunity of proceeding thither, with the agent for Lloyd's at this port, for the purpose of ascertaining the truth of these assertions.

The result of our survey was, that, at about half a mile distant from the shore, between Ribeira Grande and the Morro das Capellas, there is a line, which, with occasional projections towards the land, separates the foul and stony bottom of the coast from a perfectly smooth and firm bed of fine sand, sloping to seaward; that along this line the depth varies from 25 to 35 fathoms, and that, from the rugged nature of the coast itself, the small port of Capellas is the only part at which it would be safe for boats to disembark.

T. C. HUNT.

British Consulate, St. Michael, 24th Dec., 1841.

the mountains, which now contribute most to the wooded appearance of the surface, are fast disappearing under the axes of the fuel-cutters, and the demand for land suited to the cultivation of corn.

The number of inhabitants in 1840 was 2950, of whom 1382 were males. The people are represented to be well formed and active, and their complexion and cast of features partake more of a northern character than is generally seen in the Portuguese. The men are of good height and muscular, although frequently exposed to scarcity of food. In their manners they are mild and engaging, ready to lend each other services or provisions, and scrupulously exact in salutations, to which they give greater apparent cordiality than is observed in the neighbouring island. They are of grave temperament, and disinclined to popular sports and amusements, owing probably to the constant and sensible difficulties of their existence and the ever-present reflection that they are, in their own words, "very poor." Yet, superficially, there are no indications of this poverty: their dress is whole and cleanly, and their houses are well kept, both inside and outside, and in good repair. The cheapness of lime, pottery, and tiles enables them, at a trifling cost, to provide themselves with a sufficient stock of necessary household utensils, as well as to preserve the roofs and plaster of their houses. Indeed, there is perhaps no country of the same resources where the external appearance of the houses lends a more cheerful air to the landscape or shows more outward signs of prosperity and generally diffused wealth.

The produce of the island consists of wheat, Indian corn, oranges, and a small quantity of wine, potatoes, beans, and other articles not registered. About half the wheat and all the oranges are exported; the remaining provisions are consumed on the island. To the growth of this produce is appropriated one-sixth of the whole area; the remainder is sterile. Of the western plain, the greater part is fit only for pasturage, the rest being either barren mountain-land or underwood. There are about 2800 head of horned cattle, 2000 sheep, 1200 pigs, 600 goats, and 100 horses and asses. For these the grass and other fodder of the island do not afford a sufficient supply of food; and they are therefore fed in winter on the bruised leaves of the aloes, which are cultivated for the purpose on the stony ground and the otherwise unprofitable sides of the ravines.

The land communications are extensive, and in dry weather excellent; the nearly exclusive use of ox-carts for transporting produce maintaining a good width, and the firm consistence of the soil giving them a resisting and durable foundation. The island is on all sides easy of defence against external attack, the various landing-places being close to and commanded by high positions, and without cover for a disembarking force. The artificial defences are at present insufficient in number and in bad repair, and the number of landing-places would render a large force necessary for the repelling of invasion.

On the north coast of Santa Maria there is neither shelter nor anchorage. The N.E. point, named Point Matos, is moderately high and rocky, with high land behind it, and has a reef extending from its base a short distance. To the eastward of it, about $1\frac{1}{4}$ mile, is Point Lagoinhas, having a reef extending outward a short distance with an islet on its extremity, which islet appears high and sloped, like a mitre, and when seen in an east and west direction, exhibits a small level point extending a little way into the sea; there is no passage between the island and the shore, as it is obstructed by a rock lying in the midway. Port St. Lourenzo, on the east side of the island, is formed by a high islet of that name, and Point Matos, distant one mile to the north-

ward; here there is anchorage in 20 fathoms, sandy bottom, and water is easily procured by making pits in the beach. This place is distinguished by a church with several houses around it

At 3 miles, S. by E. from Point Matos, is Point Cedres, and $2\frac{1}{2}$ miles further is that of Castello, the S.E. point of the island; between these is a small point, off which is a rock, named Baja de Malha, separated from the coast by a clear passage 3 or 4 cables' wide, with a depth of 12 fathoms in mid-channel. Point Castello is high, with a break that forms in a peak like a sentry box: a vessel may anchor with the point bearing S.W. by S., in 10 fathoms, sandy bottom.

The town of *St. Mary's* or *Villa do Porto* is on the south side of the island, near its south-western point. At about half a mile to the westward of Castello Point is a high rock, named Sul, with a clear passage suitable for boats between it and the shore. From hence to Malbusco Point the distance is $2\frac{1}{2}$ miles, and the coast is high and steep; this point is high, and has 15 to 20 fathoms a short distance off, so that it may be pretty closely approached. From Malbusco Point, the coast trends round to the north-westward $3\frac{1}{2}$ miles, to Point Marvao, and forms a bay, the shores of which are moderately elevated; this bay is named Praya, and in its western part is Figueiral Point, surmounted by a peak 758 feet high, named Facho.

In the eastern part of Praya Bay, near Point Malbusco, is a dangerous rock of $3\frac{1}{2}$ fathoms, named the Pescador Rock. It is a small patch having deep water close to it, so that it requires caution to avoid it. If coming from the westward, keep Point Castello some degrees open of Point Malbusco; and if from the eastward, do not pass within the line of the south end of Villa Islet joining Point Malbusco, or keep Point Malmerendo in one with the middle of the island, as either of these marks will clear it.

At about three-quarters of a mile westward of Marvao Point is Malmerendo Point, the coast between bending inwards and forming the Bay of Villa do Porto, at the head of which is the chief town of the island. It is very rocky and exposed, as all winds from the S.S.E. and S.W. blow directly in, and if with any strength, cause a heavy sea, consequently it is resorted to, in summer, by small vessels only. In order to be ready for a start, it is usual to anchor to the S.E. of Marvao Point, opposite Figueiral Point. The best anchorage, known to the pilots, is about a mile from the coast, upon the line of Malbusco Point in one with the castle at the S.W. part of the town of St. Mary, when you will be entirely open of Marvao Point. Here is a depth of 36 fathoms, bottom of sand; but as, at a short distance eastward, the ground is foul, Port San Lourenzo, on the N.E. side of the island, is considered the best anchorage. At either place refreshments may be had similar to those obtained at the other islands, with the addition of partridges, which abound here.

On the west side of Malmerendo Point is a small island, named Villa, having between it and the shore a narrow channel of $4\frac{1}{2}$ fathoms water. From hence, the west side of the Island of St. Mary is of moderate height and steep, with 9 to 10 fathoms a short distance off.

Off the N.W. point of Sta. Maria there are several rocks, so that it must not be too closely approached; some of these are awash with the surface of the water.

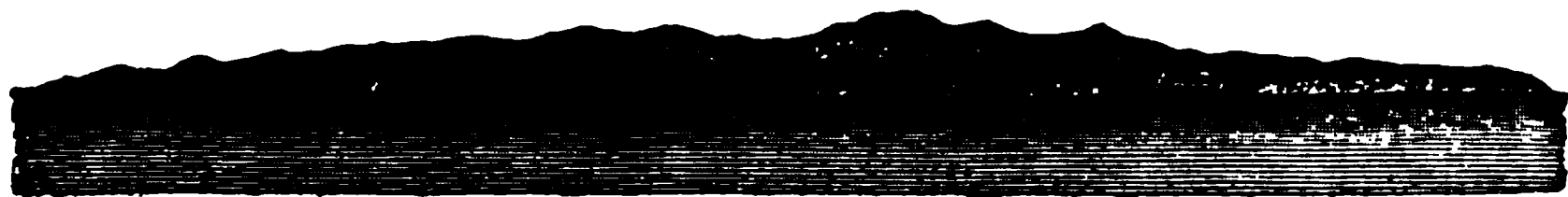
The bank of soundings around Santa Maria does not in general extend more than one mile off its shores, excepting from its northern coast, where 60 fathoms are found at $3\frac{1}{2}$ miles from the land. This depth is soon succeeded by deeper water, as from 60 fathoms the lead will sink into 100, and immediately afterwards into 250 or 300. The soundings are of coral, shells, and rock, but after the depth of 100 fathoms, they consist of sand.

FORMIGAS AND DOLLABARAT.—At nearly 20 miles, N. $45^{\circ} 15' E.$, *true*, from Point Matos, the N.E. point of Santa Maria, is the Bank of the Formigas Rocks, which consists of a submarine mountain of very irregular elevation, and which, traced to the depth of 200 fathoms, extends $6\frac{1}{2}$ miles, N.W. and S.E., *true*, and is about 3 miles in its greatest breadth.

Captain Vidal, R.N., says of this bank, "Near its western margin there is a narrow cluster of black rocks, known as the Formigas, which are about 800 yards in length by 150 in extreme breadth; their relative direction being north and south. The southernmost of them, for about 350 yards, forms a rather closely connected mass, having a small bay on the west. The northern ones are more separated from each other, and all are comparatively of little elevation, but their profile exhibits a few hummocks. That on their southern extremity, which is 27 feet above low-water springs, afforded a theodolite station, at which the true bearings of some points and heights on Santa Maria and San Miguel were ascertained. It is in lat. $37^{\circ} 16' 14'' N.$, longitude $27^{\circ} 47' 6'' W.$, and from observations made upon it on two consecutive days of very favourable weather, the following *true* bearings are derived:—Pico-alto, the highest peak on Santa Maria, S. $40^{\circ} 37' 39'' W.$; Pico Castello, at the S.E. extremity of that island, S. $29^{\circ} 4' 9'' W.$; and Pico Vara, the highest land near the east end of San Miguel, N. $32^{\circ} 12' 21'' W.$; the latter peak being 38.1 miles distant, and Pico-alto 23.4 miles.*

The magnetic variation at this station, from a mean of both days' results, on the 17th and 18th August, 1843, was $25^{\circ} 17' W.$

The most elevated rock of the group, named by Tofino Hermigon, is 35 feet in height, and stands on their eastern side, about 200 yards from the northernmost rock, somewhat more isolated than the others, and having an inclination to the southward.



S. $57^{\circ} W.$

Formigas Rocks and St. Maria Island.

With smooth water there is no difficulty in landing, particularly on the southern rocks, but in strong winds or a high swell, the sea rolls over them all, having a black naked surface entirely devoid of vegetation. One hundred and thirty yards south of the southern Formiga is a small rocky shoal, some parts of which are visible at low water; the channel between it and the rock has 5 to 6, and 15 fathoms water over the ridge which connects them, the greatest depth being near mid-channel. Again, 600 yards or about three-tenths of a mile south of the southern Formiga is another small rocky patch, having $4\frac{1}{2}$ fathoms upon it at low water. It is steep-to on the east, west, and south, but, on a line drawn from it to the Formigas, the soundings are very irregular, 11, 8, and 14 fathoms.

On the north the Formigas may be approached within a few yards, but a narrow ridge runs out from them in that direction for about 400 yards, with varying depths upon it, but no dangers. The outer extremity of this ridge

* In this description of the Formigas Rocks by Captain Vidal, the bearings refer to the *true meridian*.

has 18 fathoms on it, with the northernmost rock bearing South *true*, about 300 yards distant. Immediately north of this it drops quickly into 30 and then 50 fathoms. On the meridian of the rocks, soundings extend off to the distance of 1 8-10th mile. On the east and west they are quite clear, with deep water close up to them; but on the west, the edge of the bank is not more than half a mile off, and at the distance of 200 yards from them the depth on it will be found about 50 fathoms.

S. $47^{\circ} 7'$ E., $3\frac{1}{4}$ miles, from the station on the hummock of the South Formiga is the western head of a very dangerous shoal, named Dollabarats. It consists of two or three rocky heads or knolls, which at low-water springs have only 11 feet water on them. At that time of tide their position is marked by several large white patches, which may be distinctly seen especially so in bright sunny weather.

This shoal is near the southern end of a rocky ridge, which extends from it N. $15^{\circ} 30'$ E., 1 6-10ths mile. The soundings over it are most irregular, varying from 14 to 28 and 30 fathoms, with 45 and 50 close to its edges; but there are no actual dangers upon it except those comprised within the dotted line which is drawn around the shoal.

The whole bank of the Formigas, as we have already stated, is a submarine mountain, and its varied elevations approach the surface of the ocean in several places. The shoal of the Dollabarats is however the most eastern of these ridges, and the mountain has a steep and tolerably regular descent from it to the N.E., E., S.E., and S.; the south-eastern slope being the most gradual.

The ridge next in extent to that of Dollabarats lies 1 1-10th mile to the S.E. of the South Formiga. Its southern limit is on a line drawn from that rock to Dollabarats, and it runs from thence one mile N. 15° E, which is nearly the same direction as the Dollabarats ridge.

The least water found upon it was 16 fathoms, but the depths vary from that to 28 fathoms, beyond which it deepens abruptly on all sides. At its north end there are 18 fathoms, and next cast 44. Off its south end are two detached patches very small, the one has 28 and the other 30 fathoms on it.

Another, but smaller ridge occurs half a mile on the west side of Dollabarats, between it and that last described. It is nearly 7-10ths of a mile in length, very narrow, and the depth upon it ranges from 27 to 32 fathoms. Its general direction is about N. 10° E.

The quality of the bottom over the bank of the Formigas is principally rock, with frequents casts of fine white sand, broken shells, and small pieces of the branch coral common in our latitudes.

The Dollabarats is a very insidious danger in smooth water, but in stormy weather the seas break over it with great violence.

It seemed desirable to ascertain whether this bank was connected with the Island of Santa Maria at any fathomable depths, and a line of soundings was tried across the channel between them, but no bottom could be obtained with 300 fathoms of line.

A difference exists in the position of the Formigas as given by us, and that assigned to them by Tofino in his '*Derrotero de las islas Azores.*' The great Spanish hygrographer states in that work that from the southern Formiga the Ponta Castello bears S. $24^{\circ} 30'$ W., and Pico-alto S. $34^{\circ} 30'$ W.; the former being $4^{\circ} 34'$ and the latter $6^{\circ} 7'$ less westerly than ours. This discrepancy induced a repetition of our observations on the following day, and they gave the same result. The navigator may therefore put the utmost confidence in the integrity of our position."

TIDAL OBSERVATIONS.—It is high water on the days of full and change of the moon at the following places as below. The variation of the compass in 1843 was about 28° W.

Corvo Island	12h. 25m. ...	rise of tide $3\frac{1}{2}$ feet.
Graciosa, Santa Cruz	12h. 15m. ...	" $3\frac{1}{2}$ "
Terceira, Angra	12h. 32m. ...	" 4 "
Fayal	12h. 22m. ...	" 4 "
Pico	12h. 30m. ...	" 4 "
San Jorge.....	12h. 30m. ...	" 4 to 5 "
San Miguel	12h. 30m. ...	" 6 "
Santa Maria, Villa do Porto..	12h. 15m. ...	" 6 "

GALES, AND ATMOSPHERIC PHENOMENA.—The following remarks on the course and direction of gales among these islands were written by Mr Hunt, British Consul at San Miguel, on November 30th, 1841, and were communicated to the Editor of the *Nautical Magazine*.

"The regularity with which gales enter these seas in the N.W. quarter, and after crossing them disappear at the S.E., is a circumstance, the knowledge of which may be serviceable to the commanders of ships sailing across the Atlantic.

It seems highly probable, that if a ship were overtaken by a gale of wind in the current of the gulf stream, near the Azores (for the storms appear to be guided by this current), she could sooner be extricated from it by steering due north or south, than by any other course; that if she went to the eastward she would accompany the gale, and be overtaken by the greater violence of its centre; and that in steering to the westward she would run through the whole gale, and perhaps be immediately afterwards caught in a new one.

Another suggestion occurs to me, which I offer with great diffidence, as it is founded on the observation of one set of instruments, without that confirmation which would be so desirable from the other islands, but which is deserving investigation. The centre of a gale, in its approach, always effects a descent on the barometer, and a change in the fall of rain. In its actual passage over the instrument, the descent generally reaches 28.50, from which a rise of one-tenth appears to take place for every ten miles' removal of the centre; so that the number of miles distance from the centre of an approaching gale, might perhaps be indicated by the number of hundredths shewn by the barometer over the extreme of 28.50.

The difference in the fall of rain, also, has its regularity; the approach of the centre, bringing a temporary increase, and then a cessation of the rain, which is renewed, and in a reversed order diminished on the removal of the centre. According to the observations made at this office, there appears to be in every gale of wind, a zone of rain, about 120 miles in breadth, heaviest on the inner edge, which is about 60 miles distant from the centre; that the fall decreases in proportion to the distance from this line; and that the fall on the inner edge being about twelve-hundredths of an inch per hour, the decrease is about one-hundredth for every 10 miles of removal from that line.

The descent of the barometer, and the heaviness of the rain, would therefore give the commanders of ships pretty accurate indications of the proximity of the most dangerous part of the gale of wind.

The courses of storms having been traced by Colonel Reid, in his recent work on the subject, from the tropics to 40° of north latitude, with their courses pointing towards the Azores, it was desirable to know if these courses *were not* continued across the Atlantic, and if the frequency and violence of *gales of wind in the Azores* were not due to a tropical origin. With this

view, regular daily tables of the direction and force of winds have been kept by the British Vice Consuls, since the month of May, 1840 ; from which has been compiled the following table of the courses of twenty gales of wind, which have blown across the Azores since that time. An account has been kept of other gales, but it has been found impossible, from their crossing and neutralising each other, to trace them correctly, and they have, therefore, not been admitted into the present report

The *first gale* which comes under consideration is, the minor one of the 4th and 5th of June, 1840. This gale was felt simultaneously at Flores and Terceira, but with less violence at the latter than the former place. It was not felt at San Miguel, until (4th, 19h.) 7 p.m. on the 4th, 13 hours after its touching Terceira. The distance from the first known point of its course to Terceira, which is 300 miles, may therefore be considered half the diameter of its circle.

The *second gale* took a course so far to the northward of the islands, that little of it could be traced. On the 19th, it did not reach Santa Maria, although felt at San Miguel, which would indicate that the half diameter of its circle was 400 miles.

The *third gale* took a course directly across the Azores. It ceased to be felt at Flores, on the evening of the 5th, when it was blowing with great violence at San Miguel, over which the centre passed that day. The half diameter of its circle would, therefore, be about the distance from Flores to San Miguel, or about 360 miles.

The *fourth gale* came from a more northerly direction, and was felt at Flores. Its greatest force was experienced at San Miguel and Santa Maria, from their greater proximity to the centre. It was not felt at Terceira on the 8th, so that its half diameter was perhaps the distance from that island, to the point of its course, on the morning of the 8th, or 440 miles.

The *fifth gale* was felt on the 9th, at Fayal and Terceira, probably before daylight. On the morning of that day, its violence was as great at San Miguel as at the other isle. This circumstance renders it probable that its half diameter did not exceed 300 miles. From which fact, connected with the greater velocity of its onward progress, the conclusion arises, that the velocity of a gale, in the progress of its centre, is in an inverse ratio to its diameter.

The *sixth gale* was felt at Flores with violence, characteristic of the storms experienced near that island, but which became less as the gale receded. It followed the ordinary inclination towards the S.E. of the Azores, until the morning of the 5th, when it was suddenly deflected to the westward, running a zigzag course until the morning of the 9th, and then continuing its original inclination to the S.E. The cause of this irregular deviation it is difficult to divine. It can be scarcely attributed to the resistance of another gale, as the rotary motion of winds in these latitudes, on their polar side from east to west, and therefore not opposed to gales tending to the eastward ; and as (to be shown hereafter) the storms which pass over the Azores never return toward the north and west. This gale was felt at Flores until the 10th, when it was succeeded by the first indications of another. This circumstance would make the half diameter of its circle (as in the case of the third gale) the distance from San Miguel to Flores, or 340 miles.

The *seventh gale* was felt at Flores on the 11th, and ceased to be felt there on the evening of the 12th. According to this circumstance, the half diameter would appear to be the distance of the gale's centre, at 3 p.m. on the 12th, to Flores, or 300 miles. The progressive velocity of this gale was greater than usual, being 12 miles an hour. This diminished diameter also

accounts for the gale's disappearance from the Azores, after the evening of the 12th.

The *eighth gale* commenced with the usual violence at Flores, where it was felt until the 17th, when a change took place in the wind, indicating the departure of the gale. It was not felt at Fayal after the 12th, and its half diameter may be therefore stated at the distance of its centre, on the 17th, from Flores, or, on the 19th, from Fayal. This is about 400 miles.

The *ninth gale* is one of those, the courses of which are disturbed by some unknown cause. In this case, it is not unlikely to have been its union with the vortex of another gale, from a more northerly direction,—a supposition which might be strengthened by the fact, that after its deflection, on the morning of the 1st, it was given a degree of rotary force which it had not shown in the previous parts of its course. Its progressive speed was also diminished, and did not again increase until, on the 2nd, it resumed its previous direction. This gale was not felt at Terceira on the 3rd, and its half diameter may, therefore, be estimated at the distance of its centre from the island, on that day, or 360 miles.

The *tenth gale* set in on the 6th, coming from a north-westerly direction,—continued a south-easterly course until the 9th, and was then diverted, during 24 hours, without any change in its course, until the 11th, when it returned to its first direction. It was not felt at Flores on the 9th, and therefore its half diameter was probably 330 miles. The progressive velocity of this gale was also lessened by the same cause which deflected it from its first course.

The *eleventh gale* was very much disturbed after its first appearance at Flores, from which it, on the 12th, was turned to the south and west. Here, on the 13th, it was met by, and received its force from a westerly gale, also of much greater progressive velocity. On the 14th, it suffered another deflection during 24 hours, with a diminution of its progressive velocity; after which it again took its original direction towards the east. This gale was not felt at Flores on the evening of the 14th, and its half diameter was, therefore, probably 280 miles.

The *twelfth gale* was first felt with but moderate force at Flores, on the 4th of December, which did not increase until the 16th. On the morning of that day, it suffered a deflection from a more northerly direction, which increased its rotary force, without affecting its progressive velocity. On the evening of the 16th, it ceased to be felt at Flores, so that its half diameter may be taken at the distance of its centre, at that time, at Flores, or 280 miles.

The *thirteenth gale* was one of great progressive velocity, moving, on the 27th and 28th of December, at the rate of 13 miles an hour. As might be expected, its diameter was not so great as usual, being felt at Fayal, Terceira, and Flores, on the 27th, and not until the 28th at San Miguel. Its half diameter is, therefore, the distance from its centre, on the 27th, to Terceira, or 260 miles.

The *fourteenth gale*, although felt at Flores and Fayal, blew with the greatest violence in its passage over San Miguel, where it caused the wreck of two ships. In the harbour of Terceira, which has the same exposure as San Miguel, the ships lying at anchor were not disturbed. There are no means of ascertaining the diameter of this gale; but, judging of its progressive velocity, it must have been less than usual.

The *fifteenth gale* was felt at Flores and Fayal, on the morning of the 3rd, but not at Terceira. Its half diameter could not, therefore, have exceeded 280 miles, its progressive velocity being more than 9 miles an hour: it passed to the north of the islands.

The *sixteenth gale* was of moderate force, and does not tend to develop any general results. It cannot be traced beyond the third day, when it had only proceeded 300 miles. Its half diameter was probably not less than 440 miles.

The *seventeenth gale*, which was felt severely at Flores, on the 6th, had on that day reached Terceira, but it was blowing strong at Fayal. This gives an indication of its diameter, the radius of which must at this time have been 320 miles. On the 7th, it suffered a diversion to the eastward, and lost force in its onward progress. On the 8th, it appears to have met another interruption from the eastward, and its progress on that day was very considerably lessened. It appears to have been overcome by this interruption on the 9th, and deflected to the westward, when the small progress that it made attests the conflict between the gale and the interrupting cause. On the 10th it overcame this diversion, and proceeded in its original direction to the eastward. The disturbance was not productive of such squally, frequent, and sudden changes of wind in its neighbourhood, as would have been the case, if the disturbing cause had been a gale coming in an opposite direction. This gale ceased to be felt at Flores on the 10th, making its half diameter about 230 miles, in the latter part of its course.

The *eighteenth* was a deflected gale, losing progress as usual during its diversion. On the morning of the 21st, it had disappeared from Flores, and its half diameter may, therefore, be taken at 270 miles. The recovery of its primary direction, on the 21st, restored its progressive velocity, which it is probable was further increased on the 22nd, when it ceased to be felt at Terceira, and its half diameter had diminished to 250 miles.

The *nineteenth gale*, in the regularity of its progress, is a confirmation of the effect of deflection on the courses of storms. It passed across the centre of the Azores, at a regular rate of 8 or 9 miles per hour, disappearing from Flores during the 9th of September, when its centre was about 300 miles distant.

The *twentieth* was deflected on the morning of the 19th of September, and took a new course to the south with diminished velocity. On the 21st, it recovered its first direction, but does not appear to have regained its original velocity. This gale was but little felt at Fayal on the 18th, and disappeared there during the day. Its half diameter was, therefore, about 350 miles.

Having thus given the particulars of the twenty gales, of which the courses have been accurately observed, during the years 1840 and 1841, there appear to be some general conclusions which may be deduced from them. The first circumstance developed by the enquiry is the general direction of storms passing across the Azores, which is invariably from N.W. to S.E.

The coincidence of this course with the Great Atlantic Current, which is a continuation of the Gulf Stream, which may every day be traced to the neighbourhood of the Azores, and which the sudden rise of water in those islands (where, having been hastened by a gale, it is suddenly checked in any locality by the operation of the wind, accompanied by a diminution of atmospheric pressure,) proves to be sensibly carried beyond them, goes very far to identify the Azorean storms with the tropical gales and hurricanes, traced in the able work of Col. Reid, from the South American coast, along the course of the Gulf Stream to Cape Hatteras, in North America. There is a further resemblance in their diameters. In the chart, which Col. Reid has composed, of the great hurricane of October the 10th, 1780, the diameter given to it, in the latitude of the Azores, is about 550 miles. Of the Azorean gales under consideration, four were about this diameter; eleven of about or under 650, and five under 900.

With respect to navigators, for whose benefit these enquiries are chiefly intended, the use which may be made of this knowledge of the courses taken by storms across the Azores, is in the direction of vessels which may be reached by them. It seems probable, that if a ship were caught by a violent gale in the current of the Gulf Stream, near the Azores, her best course would be to steer, so far as the veering of the winds would allow, due North or South;—that if she steered to the eastward, she would accompany the gale, and be overtaken by the greater violence of its centre; and that by steering to the westward, she would soon meet its centre, or run into a new gale.

Whatever may be the cause of the occasional deflection of the Azorean storms, whether it arises from collision with another storm, or from atmospheric gravitation, (the radiation of the heat from the islands being at all times very great,) the uniform effect appears to be a diminution of their progressive velocity, and frequently an increase of their rotary force.

But as far as these effects can be foreseen, from a knowledge of the deflection, (presuming it always to be accompanied by a slower progression,) it is worthy of observation, that the deflection never appears to take a turn to the northward, but always to the south. If this be true, the safest course for a ship in these gales is to the north, unless there are very cogent reasons for a departure from this presumed rule.

I cannot close this report without regretting that there are no means, in the upper islands of the Azores, of combining the observations upon which it is founded with barometrical notices.

There are many barometers in San Miguel (1841), but not one in either of the other islands. The facts of this nature, developed by one barometer are not of much importance; but by comparing the result of these observations, made at the same hour in different islands, during the passage of a gale, it is likely that valuable conclusions might be elicited from them. There is, indeed, no country so well adapted for the collection of information, for the developement of the laws of storms, and meteorological changes. The islands, nine in number, are so scattered over a considerable region of the Atlantic, and separated by such distances as to receive, at the same hour different atmospheric phenomena. Were it the wish of government to obtain meteorological information from this part of the Atlantic, a moderate remuneration would secure regularity in the registers of the Vice-Consuls,—salaried or unsalaried; and they might, at no great expense, be furnished with wind-dials, barometers, sympiesometers, and hygrometers, (the latter of which would be useful in determining the origin of a gale*) for the purpose of rendering their observations complete."

MADEIRA AND PORTO SANTO.

The Madeiras are a group of islands lying between latitudes $32^{\circ} 23' 15''$ and $33^{\circ} 7' 50''$ N., and longitudes $16^{\circ} 13' 30''$ and $17^{\circ} 16' 38''$ W. They consist of five islands, Madeira, Porto Santo, and the Desertas; the latter being

* In the Azores, a southerly wind creates great humidity in the atmosphere,—a northerly wind removes it. Under the former influence, there is frequently two per cent. of water in the air,—under the latter, less than one. At Flores, such an instrument would give the most valuable results, in showing whether the gale passing had come from the south, where the heated air takes up moisture, or from the north, where a different condition repels it.

three barren rocky islets to the south-eastward of Madeira. Since their discovery in the 15th century, they have remained dependencies of Portugal.

The productions of the larger island, Madeira, are various, as in consequence of the altitude of its mountains almost every degree of temperature is obtained. The produce of the vine is the principal export: but corn is grown, although not sufficient to supply other countries. Almost every European vegetable is here cultivated with advantage; nor are the productions of the tropics wanting—guavas, citrons, oranges, bananas, coffee, &c., being obtained in great abundance. But the island is principally famed for the excellence of its climate, which is considered to be the finest in the world, so that it is much resorted to by consumptive patients.

The mean temperature of the hottest months (August and September) is between 73° and 74° ; but when the eastern and south-eastern winds bring to the island the hot air from the African desert, the thermometer sometimes rises as high as 85° and even 90° . It may also be observed that rain is not confined to a certain season of the year, but occurs at all seasons; and that hurricanes although sometimes very violent, yet are not frequent.

MADEIRA may be described as a mass of basalt, rising with a rather steep ascent from the south and north towards the interior, where the mountains are of considerable elevation, and interrupted by many deep and narrow valleys, which are frequently traversed by streams of excellent water. It is chiefly in these valleys that the vineyards and gardens are situated, some of them at an elevation of 2000 feet above the sea level. In some parts of the island the rocky sides of the mountains are very steep, and the coasts are occasionally so precipitous that soundings are only to be obtained close to the shore, and even then on a rocky and unequal bottom, and at a depth of 35 to 50 fathoms. It is remarkable that although the island is unquestionably of volcanic origin, yet there are no craters to be seen on any part of it, except San Antonio, a mountain about $1\frac{1}{2}$ mile west of Machico, which has a smooth shallow basin on its summit.

In approaching the island it appears to consist of a bare rugged rock, of huge dimensions, which although imposing is peculiarly dark and gloomy, and it is not until a near approach to the land is made, that you can discover the green patches which are everywhere scattered over its deep red soil, even to the tops of the highest peaks. This mountain verdure is owing to groves of heath and broom, which grow to an extraordinary height, aspiring to the stature of forest trees. In addition to these groves, the terraced acclivities, covered with a luxuriant tropical vegetation, change on a closer approach its distant barren aspect into one of extreme beauty and fertility. The most striking peculiarity in the mountain scenery is, the jagged outline of the ridge, the rudely shaped towers and sharp pyramids of rock, which appear elevated on the tops and sides of the highest peaks as well as on the lower elevations, and the deep precipitous gorges, which cut through the highest mountains almost to their base.

Some of the mountains in the interior of the island are of considerable elevation, and visible at a great distance at sea. The most lofty is that of Ruivo, which is estimated to be 6056 feet above the sea. It has a well defined but rather rounded summit, and stands on the north edge of the stupendous ravine of the Currael; and, with reference to the coast, it lies nearly $7\frac{1}{2}$ miles north of Ponta de Cruz, and not quite 5 miles from Ponta San Jorge. It has a continued slope towards the sea, in a north and north-east direction, and on the south-west side drops abruptly into the Curral. Throughout the western half of the island a central ridge extends, having an elevation of about 5000 feet; on its summits there is an extensive plain, named

Paul da Serra, which is fertile, and used especially for breeding mules and horses. The eastern portion of the island, although high and containing many lofty peaks, is not so elevated at the western.

The Curral is one of the greatest curiosities of Madeira, and to the lovers of natural scenery it is well worth the trouble of a visit. It is an immense valley, of almost fathomless depth, enclosed on all sides by a range of magnificent mountain precipices 1000 feet high, the sides of which are perpendicular and broken into every variety of buttress or pinnacle. Round a part of the cliffs is a narrow road, leading to the garden houses and country plantations, cut out of the rock, about 10 or 12 feet wide, on riding along which the Curral seems like an immense abyss, filled only with clouds and vapours, rolling in a constant motion over each other. When viewed on a fine day, the variety of tints is very striking. Occasionally the cliffs are black and craggy, at other times they are covered with turf of the richest green and trees indigenous to the island; while far below smiles a region of cultivation and fruitfulness, the white cabins of the islanders scattered over the surface of the country being almost hidden amongst the rich gardens and orchards.

In 1838, the Curral was visited by Com. Wilkes, of the United States Navy, who remarks:—"This is a very remarkable spot, and it is difficult, if not impossible, to give an idea of its beauty and grandeur. This place is approached by the usual ascent from Funchal, through the narrow roads, or paths hedged with roses, &c., the view gradually extending beneath, over the terraced vineyards. Just before reaching it, you mount a small ascent; you are then on the summit or edge of the Curral, and the whole scene suddenly bursts upon you. The eye descends to the depth of 2000 feet, into the immense chasm below, and wanders over the ragged and broken outline of the many peaks that rise from its very bottom; then upwards, following the grey precipitous rocks, till their summits are lost in the clouds, which are passing fitfully across it, occasionally permitting the sunbeams to glance to its very bottom. One feels surprised on gazing on this scene, that its character of wildness should become softened, and its beauty increased, which is effected in part by the plants and shrubs which cling or have fastened themselves into the fissures of the rocks. These the eye gradually makes out, and is led by the small and narrow strips of green on the ledges downwards, until it finally rests on the secluded church of Nostra Senora de Livre Monte, and the peasants' cabin embedded in the dark and luxuriant foliage beneath, whose peace and quietness are in such strong contrast with the wildness of nature above. The whole looks more like enchantment than reality. The shape of the Curral and its perpendicular sides gives the idea rather of a gorge than of a crater.

In the descent the road winds along the sides of the precipice, turning around sharp and jutting projections, with a frightful gulf yawning below. A misstep of the horse would plunge the rider to destruction. At every turn new and striking views are brought out, almost surpassing in grandeur the first. The descent is so gradual, that one scarcely seems to advance downwards, and the length of time necessary to accomplish it (upwards of an hour) will give some idea of the vastness and grandeur of the scene. Continuing on, the gorge opens to the south, where the streamlet of the Curral, joined by several lateral branches, forms the River Socorridos, which empties itself into the sea at the ancient town of Camera de Lobos."

The shores of Madeira are mostly lofty cliffs, occasionally facing the water with a perpendicular front of 1000 or 2000 feet in height. The cliffs are interrupted by a few small bays, where a richly cultivated valley approaches the water between abrupt precipices, or surrounded by an amphitheatre of

rugged hills. In these small bays are generally situated some villages.

Off the eastern cape of the island are many isolated rocks, having bold abrupt sides and broken outlines. The character of these rocks is remarkable; they stand quite detached from the adjoining cliffs, and some of them are of a slender form rising to a great height, with extremely rugged surfaces, and broken edges. Through some, the waters have worn arched ways of large dimensions, which afford a passage for the breaking surf, and would seem ere long to threaten their destruction. Similar needle rocks are seen off the northern Deserta, one of which, bearing some resemblance to a vessel when viewed from a distance is often mistaken for such. It stands like a slender broken column, several hundred feet in height, on a base scarcely larger than the summit.

In no part of Madeira is there a sheltered harbour; and the word 'Porto,' which is attached to several places on the chart, must be taken as the designation given by the islanders to the little coves, or landing-places, where they haul up their fishing-boats, and those of larger construction, employed in the transport of their wines to Funchal, or on other coasting business of the island.

It may be stated generally, that the south coast of the island has a gradual slope from the mountains in the interior to the sea; and that the north and west coasts, on the contrary, are, with few exceptions, high and bold, and descend precipitously.

The cultivation of the island, on its south side, seldom extends more than from 2 to 2½ miles inland; and, on its north side, not half that distance; and it may be remarked, that no cultivation is at present attempted at elevations exceeding 3000 feet, the whole of the mountains above that height, and which constitute so large a portion of the island, being left wild and uninhabited.

Funchal—The capital of the island is Funchal on the south-east coast, which consists of a pretty wide street along the sea-shore, where there are several good buildings, and numerous small lanes extending to a considerable distance up the slope of the hill. The number of houses amounts to about 2000, and that of the inhabitants to 20,000. The town is defended by four forts, and has eight churches and several convents. In the midst of the town is an open square, planted with exotic trees, as *dracena draco*, *jasminum azoricum*, and *datura arbosea*.

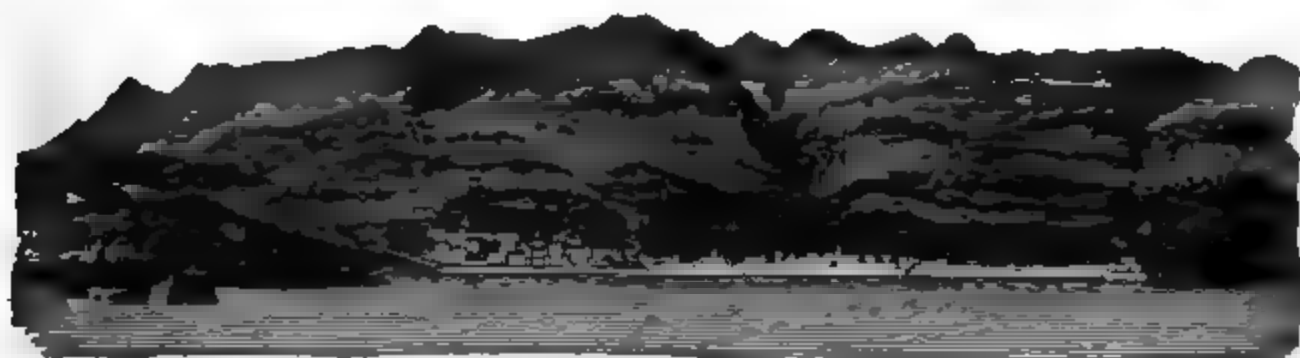
The view of Funchal from the harbour is very pleasing, and its situation, in a kind of amphitheatre formed by the mountains, adds to its beauty. The contrast of the white buildings and villas with the green mountains, forms a picture which is much heightened by the bold quadrangular Loo Rock with its embattled summit commanding the harbour in the foreground. The most conspicuous objects on the west side of the bay are the Peak of Ponta da Cruz, the Partinha with the Loo Rock near it, and the old fortress of the Pico, on a rocky eminence half a mile north of them. To the eastward of these are, the Castle of Lourenzo the official residence of the governor on the beach, and the outlet of San Paulo River, the square towers of the ex-Jesuits' College, the cathedral having a small triangular spire, Bangor's Pillar on the beach near the custom-house, and on the extreme east the Castle of Santiago with the quintas upon the sloping land behind it. All these buildings are very conspicuous, and of dazzling whiteness.

When approaching Funchal the island appears rough and mountainous, but the steeps are clothed with rich and luxuriant verdure. Terraces are visible on every side, and every spot that the ingenuity of man can make available has been apparently turned to advantage, and is diligently cultiva-

ted. These spots form an interesting scene, particularly when contrasted with the broken and wild background, with the white cottages clustered on the sea shore, and gradually extending themselves upwards until the eye rests on the highest and most striking building, that of the convent of Nostre Senora de Monte. This stands out conspicuously on one of the mountain ridges, which descends from the Peak of Arrebentao towards the city. It is 1965 feet above the sea, while the peak itself is 3844 feet high.

The gardens in the vicinity of Funchal are exceedingly beautiful, abounding as they do in trees, shrubs, and flowers, and so many varieties of delicious fruits and vegetables common to the tropics and to Europe. The markets are, in consequence, well supplied with these good things, and all necessary refreshments; and there is an ample supply of excellent water.

It may be observed that a depôt for steam-vessels has lately been established at Funchal (1848). Its situation is near the beach, at a short distance from the custom-house.



Funchal Bay and Town.

THE COASTS.—When approaching Madeira from the eastward the first land met with is the Ilheo de Fora, an islet lying close to Ponta de San Lourenço, the eastern extremity of the island. This islet is two-fifths of a mile from N.E. to S.W., and exceeds a little one-tenth of a mile in breadth. Its coasts are everywhere rocky cliffs, except at its S.E. side, where it slopes to the sea, and offers the easiest landing. On the west side is a little rocky cove. A sugar-loaf rock marks its south extremity, and there are four low rocks to its S.E. shore, nearly midway between its extreme points. The surface of the islet is of very uneven outline, and covered with a light and stony soil and sand. Near its north end is a peak, 352 feet above the sea, in lat. $32^{\circ} 43' 14''$ N., and long. $16^{\circ} 39' 30''$ W. The channel which separates the island from San Lourenço Point is 200 yards wide, and the depth in it at low water is from 3 to 4 fathoms over a very rocky bottom, but a swell or strong breeze with opposing tide occasions so great a turmoil in it, that it is frequently unsafe for boats to pass through.

Fora is steep-to in all directions, except its S.E. side, off which are dangerous rocky patches surrounded by deep water. The outer one, which lies S. 49° E. 0' 38-100ths of a mile from the Islet Peak, is a small rock with 4 fathoms on it, and 13 and 26 fathoms close to it. The inner patch is more extensive, bearing from the peak S. 34° E., three-tenths of a mile; and upon this are several rocks, some with 15, other with only $4\frac{1}{2}$ feet over them. Between the outer and inner patches the least water is 10 fathoms, and between the inner patch and the islet is a narrow channel, the depth of which ranges from 9 to 16 fathoms. Both patches have deep water close up to them, from 16 to 26 fathoms; their distance from the shore is so inconsiderable that

sailing vessels would scarcely venture near them ; but steam vessels should be cautious not to round the point too closely.*

At Fora the extreme land seen to the westward is the low point of Oliveira, bearing S. $58^{\circ} 36'$ W., distant 10.46 miles ; but the bold head of Cabo Garajao, or Brazen Head, being much higher than Ponta Oliveira, is seen over it, and thus appears to be the west extreme point. Vessels bound for Funchal shape their course for these points ; but between Fora and Oliveira there is a considerable bay, and the coast presents a variety of outline which it is necessary to describe.

Ponta de San Lourenço is the easternmost part of Madeira. It is a long narrow ledge of rock, about 4 miles in length, but in no part one in breadth. Its surface is exceedingly varied, but its general tendency is that of declivity from the cliffs and peaks on the north side, to a low rocky shore on the south. The cliffs and peaks, though lofty, are not nearly of so great elevation as those of the island in general, but are of a much more broken and fantastic character. Here and there a patch of herbage only affords scanty pasture to a few sheep and goats.

From the extremity of *Ponta de San Lourenço* the coast trends to the N.W., and is a rocky shore. For the first $1\frac{1}{2}$ mile it is composed of cliffs and small points with rocks lying out a few yards from them ; and above the cliffs is a narrow ridge of hills, of which the most elevated is 348 feet above the sea. A narrow beach of shingle then succeeds, with masses of rock upon it, running out to the N.E.. Between these, in two or three places, the seas on the north and south sides of the point meet at high water, and make them islets ; and it is probable, that in a few years more, they will be actually broken up, and become such permanently. This beach terminates at *Ponta Furada*, a bold basaltic point, through which the sea occasioned by S.E. gales has broken a fine lofty arch. A barren hill 550 feet high stands immediately above the point, and from its summit there is a commanding view of the surrounding shores.

On the west of *Ponta Furada* is a small bay with a fine sandy bottom, in which there is smooth water anchorage with the wind from N.W. and N.E., and tolerably easy landing. The bay is about a mile across, and three-fifths of a mile deep ; but it is only available for steam-vessels. Half a mile beyond the western point of it is the *Ponta de Piedade* crowned by a rocky hill, 376 feet above the sea, with a chapel on it, dedicated to *Nostra Seniors de Piedade*. The building, though small, is a very conspicuous object, being white-washed, and roofed with bright red tiles. This chapel in line with the Sugar-loaf Rock at the south point of Fora leads a few yards clear to the southward of the rocky shoals off that islet. In front of the point is a large flat ledge of rock (having almost the appearance of a fine artificial quay), on which there was found sufficient landing.

From the north side of *Piedade Hill*, quite across the narrow neck of land to the opposite, or N.E. coast, occur those curious fields of fossils mentioned by several travellers who have visited Madeira, and which are similar to those at Porto Santo. It is believed they are not to be found in any other parts of these islands. Immediately on the west of *Piedade Point* is a little bay with a fine sandy beach.

At 1.3 mile S. 74° W. from *Piedade Point* is the village and point of *Canical*. The coast between them is much lower than that previously described ;

* In this description of the shores of Madeira, which has been taken principally from Captain Vidal's valuable communication in the *Nautical Magazine* 1848, the bearings are not magnetic, but have reference to the true meridian.

but broken in like manner into numerous small points, and the land rises from it in a gradual slope to the top of the cliffs on the north shore. There is a little sandy beach east of Caniçal Point, on which the fishing-boats of the place are left. At the west end of the beach is a ledge of dry rocks. The bank of soundings follows the coast to the westward: the edge of it passing one mile south of Fora, Piedade, and Caniçal.

From Caniçal Point the coast runs S. 43° W., 1.45 mile to the north point of Machico Bay. Between them the cliffs are high and bold, and there are two projecting points. The southern one is a rocky bluff very steep-to; and half a mile inland of it is a peak 1969 feet above the sea.

North of Machico Point is a telegraph on a hill 1080 feet high. One-tenth of a mile to the N.E. of the point are several rocks which run out from the shore S. 22° E., about 250 yards; and in the same direction is an isolated breaking rock standing in 15 fathoms water. At the rock, Machico north point bears N. 48° W., and is distant two-tenths of a mile. Close to it on the east are 27 fathoms.

BAY OF MACHICO.—The Bay of Machico is 700 yards wide, and a stony beach with some little mixture of sand forms its shore. On the north point of it is a small stone fort, and near its centre is a little battery built at the outlet of a mountain stream, which originates in the high lands of the interior five or six miles distant, and drains the whole valley of Machico. The village is situated near the shore of the bay, and is celebrated in the traditions of the island as the place where its first discoverer Robert Machim landed with Anna d'Arfet. Its little church is reputed to contain a portion of the cedar cross that marked their grave. The village possesses a considerable number of fishing-boats, and a few of larger dimensions for trade with Funchal.

From Machico the coast runs S.S.E., half a mile, to Ponta Queimada, which is a rocky cliff with some flat rocks at its base, and from thence S. 32° W., 1 mile 15.100ths to the rock off Ponta de Santa Catarina. This rock is 36 feet high, and stands close to the point. The whole coast between it and Queimada is rocky cliffs: and both they and the land behind them are of much less elevation than near Queimada. There are no outlying dangers, but deep water close up to the shore.

From Rocha de Santa Catarina, the next point is Guindante bearing S. 43° W., $2\frac{1}{2}$ miles, the coast between falls back into a bay half a mile in depth. Near the north end of it is the village of Santa Cruz, and two large water courses or ribeiras. In front of the village is a stoney beach with a rocky point at each end of it, crowned with a redoubt, and the water shoals gradually to the beach. Eastward of Santa Cruz, the coast and land is rather low. To the southward of the village the cliffs again increase in height, and have deep water quite up to them.

S. 40° W., nearly a mile, from Ponta Guindante is Ponta de Atalaya. The village of Porto Novo is situated close round Guindante in a small shingle bay where a considerable *ribeira* has its outlet.

From the *ribeira* to Atalaya Point, the cliffs are high and steep. The Point of Atalaya is itself formed by a few large stones at the base of the cliffs, but there is a singular small pointed peak on the cliff close to it which marks its position well. From this point Ponta Oliveira bears S. 51° W., 1 mile. Between them the coast has a slight bend in it; there are two small beaches; and in front of the first one, named Portinha, are some detached flat rocks; behind which some fishing-boats are hauled up: a small redoubt commands it. At the south side of the second beach is a very large *ribeira*; and on the top of its southern bank, a short distance from the edge of the cliff, a fort.



From Ponta Oliveira, Cape Canaries the Brazos Head bears S. 57° W. distant 11 miles. The former is a clean rock point steeply up on which is a small settlement. The latter is a bold rocky head of land projecting out about 60° or 70° views at right angles with the line of coast to the eastward. It is made up of rounded gray cliffs of red and yellow tuff, and above them a half a mile or more of bare, snowed to the top. I have known 420 feet of the snow which distinguishes the head when seen from the westward. The top of the point and the interior of the rocky knoll is a knoll on which commands an extensive view to the eastward, and reports all vessels in that vicinity on the whole length of the Cape Horn. The cape is steeply up to the top within a distance of 100 paces. Its path was a quarter mile or less from the base. The path is rough and six-tenths of a mile off there will be found the entrance. The edge of the bank of its windings between Canaries and this head follows the general direction of the coast at distances varying from six to eight or a mile to a mile.

91. The east side of Crater Lake is formed by high cliffs on the west, horizontal cliffs on the shore, and then, westward, the coast line projects in series of lower cliffs and then, still a number to Sunset Point.

PUNCHBURY LAKE—From the extreme point to the westward of Punchbury, bearing S. 85° W. distant nearly 5 miles, between is the Lake of Punchbury, which is now exposed to the south. The lake is dissected by the river, cutting a southwest gash. Beyond Fort Snelling, a small island, which is now a point, is the western end, front of the lake, and terminates in the S. E. corner. The shore then becomes rocky and rises into a low basaltic hill, exposed to the Rock, little beyond which the river turns about inland, and disappears, and the shore now is the continuation of the Point.

The *Embarkation* is an artificial embankment carried up by a southeasterly gale to the high water mark, and is covered by the fire of Sam Ruse. The water will not pass under the embankment, and on its eastern side is the low water mark of ordinary tides, there being on the inner side of the embankment a stone wall, from the sea to the fort, and to the rear of the embankment which covers the road to the city. It also affords some protection to the vessels which occasionally seek shelter behind the fort.

[illegible]

There are a number of factors that are involved in the development of a child's language skills. The most important factors are the child's environment, the child's genetic makeup, and the child's social interactions. The child's environment plays a major role in the development of language skills. The child's genetic makeup also plays a role, but it is not as important as the environment. The child's social interactions are also important, but they are not as important as the environment. The child's environment is the most important factor in the development of language skills.

The Laguna de San Pablo is a very large lake in the high lands near the mouth of the Rio Grande, its waters flowing into the Gulf of Mexico. San Pablo is a town of 1000 inhabitants situated on the highway between Santiago de Comate and the castle of San Lorenzo. The station San Pablo marks the way between that castle and Fort St. Cayetano. Another

summer these streams are generally inconsiderable, but in the heavy rains which occur in winter, they have occasionally come down with overwhelming force, and caused much damage to the city. The depth of water in the bay is said to be gradually decreasing from the quantity of alluvium they bring down.

The soundings over Funchal Bay are regular, and the quality of the bottom a fine dark sand with some little mud.

On the meridian of Fort Pelorinho, at 300 yards from the beach, there will be found a depth of 11 fathoms; at 400 yards 18 fathoms; at a quarter of a mile 20; at half a mile 40; at nine-tenths of a mile 100; and at 1 mile 200 fathoms.

On the meridian of the Loo Rock, at the distance of a quarter of a mile, the depth is 25 fathoms; at half a mile 38; at three-quarters of a mile 58; at one mile 100; and at one mile and one-fifth 200 fathoms.

Anchorage.—In the summer months when land and sea breezes prevail vessels may anchor anywhere about the bay, as most convenient. but the best anchorage, especially during the winter months, is off the Loo Rock, with the old citadel named the Castello do Pico bearing North, and exactly midway between the Loo and the Fort of San Jose on the Pontinha. On this line of bearing steam vessels may anchor in 12 to 18 fathoms, and sailing vessels in 25 to 35. This latter depth is half a mile from the Loo Rock. The soundings extend farther out in this direction, with fine sandy bottom; and should any vessel have previously taken up this position, it will be better to anchor to the westward of her.

A considerable surf very commonly prevails along the whole of the beach, and renders communication between vessels and the shore difficult. It is seldom attempted but in native boats. This is a very serious inconvenience, especially to the numerous invalids who resort annually to the island, and a good landing-place is a great desideratum. Nevertheless nearly all mercantile business is carried on from the beach; and through the experience and dexterity of the boatmen, aided by the build and lightness of their boats accidents but seldom happen.

The boats of men-of-war and steam packets usually land at the steps of the Pontinha, but it is at rather an inconvenient distance from the city.

Winds, &c.—The Road of Funchal being exposed from West to S.E., the winds from those points will of course be felt most strongly, and ships, on the appearance of a menacing atmosphere to the southward or the S.W., ought to take every precaution, and be in readiness to go out of the roads at a moment's warning.

In summer, there are regular land and sea breezes; the latter setting in from the S.W. in the forenoon, and off shore towards 9 and 10 o'clock in the evening, sometimes as late as midnight. The land breezes do not extend more than 2 or 3 miles from the shore; but when it blows fresh in the offing, the true wind prevails in the road. The rainy season is in January, February, and March, when it blows sometimes excessively hard, at which season it is frequently dangerous to remain at the anchorage; and during this period of the year, the surfs on the beach are so incredibly violent, as to prevent a possibility of landing anywhere but behind the Loo Rock.

When sailing from Funchal, you should particularly observe to make sail with the land wind, standing directly out to the offing, on account of calms which prevail under the West and S.W. parts of the island, which have been known to detain vessels for some days.

Although Madeira is an elevated island, with the exception of the eastern end, which is a low rugged point, yet it is so often obscured by clouds as not

to be discerned at a distance of 5 leagues ; but when abreast of Porto Santo, it commonly appears like a vast mountain, with its summit covered over. The Desertas are shortly afterwards seen, and when you pass those islands, the ships in the road of Funchal will soon be perceived. From their riding, it will be seen how the wind is in the road, as it is common to have a strong breeze from N.E. or East, in passing Desertas, when at the same time, the wind in the road is from the S.W. or W.S.W.

Port Regulations.—The following port regulations were in force a few years since, and may be still observed :—

On anchoring at Funchal Roads, no vessel can have communication with the shore, or the shipping in port, until visited by a flag-boat from the government, or from the health office. But in case of distress, when a vessel does not intend to anchor, and wants to have communication with the shore, her boat, by proceeding to the Loo Castle, will avoid being fired at; and after examination, leave is generally given for the officer in her to go into town, and return to the ship without any embarrassment.

The master, purser, or other persons coming in the first boat from any vessel regularly visited, must land at the health office, there to undergo the customary examination; and the captain or purser should proceed immediately to the consul's office, to report the ship: passengers are free from restraint after passing the health office.

Captains or pursers, so landing, must bring with them the vessel's register and Mediterranean pass, and also the manifest of her cargo, as without these documents business cannot be transacted at the Consular and other offices.

No vessel lying in port can have any communication with one that is coming in, or that has already anchored, until such new comer shall have been regularly visited.

No vessel at anchor can change her berth without license from the government.

All boats that pass between the shipping and the shore, after sunset, are subject to pay a pistareen and a half, for a government license.

No seaman or soldier to leave their ships, without permission in writing from the captain or commanding officer.

Any seaman or soldier found on shore after sunset, without written leave of absence, is liable to be taken up by the government, and kept in custody until claimed and sent on board ship; which will, exclusive of his maintenance, occasion an expense of 2 dollars for each individual, to be deducted out of his wages: and even with leave, as above, any disorderly conduct is immediately taken notice of by the government, and punished accordingly.

All captains or commanding officers are requested to read the above two articles to the sailors and soldiers on board their ships, as particularly relating to them.

Captains or pursers must give notice at the consul's office, 24 hours, at least, before the time of their intended departure.

No vessel is to carry from Madeira any person or persons, excepting those that came in her, without a regular passport; as, in case of detection in attempting to do so, the master is liable to a fine of 100 dollars, and to 3 months' imprisonment,

In cases where the captain of a vessel shall be judicially notified not to carry away any particular person from the island, and he does receive him on board, notwithstanding such judicial warnings, he becomes liable for all the debts which such person owes.

When vessels are ready to depart, the captains must, through the consul, or their consignees, apply to the government to have its visit sent on board at the hour when they will be ready to proceed to sea.

After a vessel has been visited for the purpose of proceeding on her voyage, and circumstances require her to have communication with the shore, or the shipping in port, she cannot sail until visited a second time.

No vessel can sail after sunset, without special license; and in case a ship is visited for departure, and finds she is obliged to remain a night after, she must not attempt to sail till visited a second time.

As vessels are frequently fired at from Loo Castle, for attempting to anchor at night, it is recommended to those who make the port too late in the evening, to have their colours seen, to stand off and on till daylight, when the restriction ceases; indeed, at all times it is as well to hoist the colours and merchant's signal as early as possible, for the information of the consignees on shore.

Any vessel attempting to get under way before she is visited, will be fired at from the forts, and will be obliged to pay very dearly for the powder and shot. This must also be understood in not observing any of the foregoing rules.

No commander of a vessel can leave any of his crew behind him, excepting in the hospital, without first giving security in the consul's office for their subsistence.

As the greatest attention is necessary on the part of the masters of vessels, for the benefit of the concerned, it will be found much to the interest of all parties, that they by no means sleep on shore,—a caution of this kind is doubly necessary in the winter.

It is necessary that captains and supercargoes should be acquainted, that in case of breakage in the measurement of corn, after allowing $2\frac{1}{2}$ per cent., the vessel must make up the deficiency at the market price in Madeira, according to the long-established regulation of the British factory.

The Loo Castle usually fires two guns without shot, on any vessels breaking the rules of the port: if those are attended to, in general they take no more notice; if not, not only the Loo, but the other forts, fire with ball, till their object is obtained.

As many inconveniences arise from not observing the foregoing regulations, every commander of a vessel will find it to his interest to attend to them, as otherwise he will forfeit the protection of his consul, and find the consequences in the highest degree disagreeable.

To avoid considerable delay and expense, it is absolutely necessary to have a bill of health, endorsed by the Portuguese consul, or his vice-consul, of the last port of clearance.

THE COAST WESTWARD.—From the Pontinha, at Funchal, to Ponta de Cruz, the distance is $1\frac{1}{2}$ mile, and the coast between them has a broken outline of rocky cliffs, points, and bays. At the south-west point of the Pontinha a rocky spur projects to seaward about 30 yards, and in the bay to the west of it, 250 yards within the point, are two small flat rocks, a few feet above water. The bay is half a mile across, and the shore of it is composed of steep cliffs, which rise to a high bold bluff at its western extremity. Along the base of these cliffs there is a beach of sand and shingle of some breadth near the root of the Pontinha embankment, but narrowing gradually towards the centre of the bay, and terminating near the outlet of a watercourse. *The whole of this bay is comparatively shallow, the depth not exceeding 8*

fathoms between its extreme points; and it appears to offer the best position that can be found at Madeira for any artificial harbour works.

Half a mile westward of this is a detached sugar-loaf formed rock, named Gorgulho; it stands about 130 yards from the shore in front of a little bay which has a fort upon its eastern point, and near the centre of it a pretty quinta. Four-tenths of a mile north of this rock is Monte da Cruz, with a telegraph on its summit, 862 feet above the sea, and from hence there is a succession of rocky cliffs for another half mile to the Ponta da Cruz; at the south-west extremity of which there is a semi-detached pointed rock with a small iron cross upon the top of it. The cliffs opposite are high and perpendicular. This rock forms the southern extreme of Madeira, and is in lat. $32^{\circ} 37' 18''$ N., and long. $16^{\circ} 57' 11''$ W.

The coast from the Pontinho to this point is steep-to, and clear of danger; and the edge of the bank continues nearly parallel with it, at the distance of about a mile.

North $72^{\circ} 15'$ W., 85-100ths of a mile from Ponta da Cruz, is Ponta d'Agua, a low point covered with large stones, at the base of some enormous cliffs. The greatest deviation of the coast from the line of the extreme points is four-tenths of a mile. Close round Ponta da Cruz, on its western side, is the Bay of Praya Formosa, formed by a shingle beach six-tenths of a mile long, and about two-tenths deep. The high land recedes from each end of the bay towards its centre, and leaves the space between filled with a large bed of shingle. At the west end of Praya Formosa is a small rocky islet, and from thence a line of rocky cliffs of small elevation, fronted by a stony beach, and many detached black rocks extend six-tenths of a mile farther to the Soccorridos River. This mountain stream, perhaps the largest in Madeira, originates at the southern base of Pico Ruiva, amongst the group of highest mountains on the island; and drains the celebrated valley of the Curral. Immediately in front of it is a beach of shingle, and at its west end a small bold rocky point, round which is the village and little boat harbour of Camera de Lobos.

The eastern side of this inlet is formed by steep rocky cliffs, and the western side by a narrow wavy line of black lava, running out south at right angles with the beach for about 270 yards.

The town of Camera de Lobos is situated at the head of the cove, and behind it is a hill with a telegraph on its highest part. About 100 yards from the western point of this inlet there is a small fort built on a rocky cliff near the sea; and beyond the fort, a sandy beach a quarter of a mile in length, over which the Ribeira of the Jardim da Serra discharges its waters. At the west extremity of this beach commence the magnificent cliffs which terminate the ridge of mountains lying westward of the valley of the Jardim. The highest of them form the bold sea face of Cabo Girao, and upon the high land which crowns the cape is a grove of pine trees, 2079 feet above the sea. From thence the hills continue rising until they reach the head of the valley, their highest point at which they attain an elevation of 4535 feet. At the base of these high cliffs is a narrow beach of shingle, thickly strewn with large blocks of stone, with here and there some slightly projecting points, produced by the occasional fall of rocky masses from above.

North $70^{\circ} 30''$ W., 4 63-100ths miles from Ponta d'Agua, is the outer rock off Ponta do Sol. Intermediate at the distance of $1\frac{1}{2}$ mile to the westward of Ponta d'Agua is a conical shaped rock, named Ilheo da Lapa. It lies in front of the village of Campanaris, detached from the shore, though very close to it; and here the continuous line of stony beach covered with large blocks and boulders may be said to terminate; and from hence to the west-

ward this characteristic alternates with clean black rocky points without any beach at all before them. The cliffs become more inclined, and there are some large slips which are cultivated and inhabited.

One mile and a quarter beyond Ilheo de Lapa is the rocky point of Ribeira Braba, with three small black rocks close off it; on the western side of it is a little bay a quarter of a mile across, with a beach of coarse sand, shingle, and boulders. A short distance from the beach is the village of Ribeira Braba; and near it the outlet of a mountain stream of the same name, which drains the valley of the Serra d' Agoa.

To the westward of this bay the coast becomes more varied, more irregular in height, and is again fronted with a narrow beach of shingle and boulders; and three-quarters of a mile beyond Ribeira Braba is the small Ribeira of A Tabua. Like all these mountain streams its waters are discharged over a beach of shingle, with rocky cliffs on either side of it. At three-fifths of a mile farther is a large cultivated land slip, and from thence the coast trends a little more westerly, for three-quarters of a mile, to the rock at Ponta do Sol, and a small bay lies between them.

Ponta do Sol is a bluff rocky cliff with a few fragments of rock lying close in front of it. The most conspicuous of these is pointed and has a small wooden cross upon its summit. Three small rocks lie off it to the southward about 40 yards, and two-tenths of a mile N. $66^{\circ} 30'$ W. of it is another. On the west side of the point is a Ribeira with a shingle beach in front of it about 800 yards in length.

The outlet is narrow with steep cliffs on either side, and a stone wall has been constructed across it, leaving a passage for the stream close along the foot of the western cliff. The source of the Ribeira is between 4 and 5 miles inland, to the N.N.E. of the point, amongst the high lands at the southern margin of the Paul da Serra. The village of Ponta do Sol is situated in the ravine a very short distance from the beach, and its church may be seen through the narrow gorge of the outlet, though to a very limited extent in consequence of the cliffs.

From Ponta do Sol, the next extreme point seen to the westward, is Ponta Galera bearing N. $57^{\circ} 45'$ W., and distant $5\frac{33}{100}$ miles. The coast between them nowhere falls back half a mile, but is formed by a long wavy line of narrow stoney beaches, above which are cliffs of small elevation, much broken by mountain torrents into ravines. There are a few land slips, and in some places the land slopes to the sea without cliffs; these lands are always inhabited and cultivated with numerous terraced vineyards. There is a remarkable piece of cliff standing between land of this description, $1\frac{1}{4}$ mile from Ponta do Sol; its west extremity forms a small black basaltic point. Three-quarters of a mile beyond it is the village of Magdalena at the outlet of a Ribeira.

About half a mile to the westward of Magdalena is a detached rock lying of 100 yards from the shore in front of a high rocky cliff, at the foot of which is a stony beach. There are 6 fathoms water alongside the rock. Again, 2 miles beyond Magdalena is another Ribeira; and in the space between is the Arco da Calheta. Arco is a name applied to such hills as present a semi-amphitheatre open towards the sea with a gradual rise of the land from the shore towards their summits. They are generally well cultivated, and dotted with habitations. Six-tenths of a mile westward of this last Ribeira is the Town and Ribeira of Calheta. Two or three white houses stand low down near the stony beach in front of it, but the ravine is so narrow that little of the town, unless when abreast of it.

Above the cliffs on the ridge of land, a quarter of a mile west of Calheta, there is a conspicuous long building like a monastery.

From Calheta to Ponta Galera the distance is seven-tenths, of a mile. The point is formed of flat rocks of black basalt, which run out like a pier about 100 yards from the cliffs of the coast. There are $4\frac{1}{2}$ fathoms twenty feet from it.

At Ponta Galera, Ponta Jardim bears N. 56° W., 1 mile and 35.100 ths. The line of coast between them preserves the same general character ; and about midway is the waterfall of Ribeira Funda. Ponta Jardim appears to be a land slip ; some large boulders lie close round it, so as to render landing difficult. Upon the top of the point is a small village and chapel. Here the coast scenery becomes more bold, and the rise from the shore to the mountains is very steep.

The soundings on this part of the coast are regular, over dark sand, and extend off $1\frac{1}{2}$ mile. On the meidian of the Jardim Chapel, at the distance of a quarter of a mile from the shore, there are 10 fathoms ; at half a mile 16 ; at three-quarters 25 ; and 1 mile 30. At Ponta Jardim the two next points beyond appear in a line bearing $37^{\circ} 50'$ W. The first (Paul do Mar) being 1 mile—and the second, Fajao d'Ovelha $2\frac{7}{10}$ ths miles from it. There is a waterfall $\frac{3}{10}$ ths of a mile north of the Jardim, and another at the Paul do Mar. The coast between the Jardim and Paul do Mar consists of steep rocky cliffs fronted by a stony beach ; but close to the waterfall at the latter point on the west there is a great land slip. The cliffs recede about two-tenths of a mile ; and the land between them and the sea having a steep descent is cultivated in terraced vineyards.

The village of the Paul do Mar is built at the eastern end of the land slip close to the waterfall, from which a beach of shingle and large stones extends the whole way to Fajao d'Ovelha. At that point it is broken through by a little spur of black lava projecting a few yards to seaward, the cliffs become more elevated, and above them the land rises with a steep ascent to the highest peaks on the ridge of the western mountains 4270 feet.

Some idea of the bold character of the scenery at this part of the island may be conveyed by stating that a grove of pines upon the hills above the Paul do Mar is at an elevation of 2030 feet, or one-third of a mile, whilst its horizontal distance from the sea does not exceed half a mile. North $22^{\circ} 30'$ West, $2\frac{66}{100}$ ths miles beyond Fajao d'Ovelha is Ponta Parga, the west extremity of Madeira, in lat. $32^{\circ} 48' 06''$, long. $17^{\circ} 16' 38''$ W., the coast between these points falls back into a bay 0.34 of a mile in depth. The cliffs are lofty and broken by several mountain torrents, and at their base are many large stones and fragments of rock ; one in particular, of a sugar-loaf form, near the centre of the bay, is 72 feet high : two-tenths of a mile north of it is another large rock, frequently used by the fishermen as a landing-place, and they have a ladder from it to the shore.

Between the landing-place and Ponta Parga the beach is wholly composed of stones, and there is a narrow piece of sloping land between it and the cliffs, upon which are two or three fishermen's huts, and a few boats of a construction peculiar to this point. They are in fact a species of catamaran nearly triangular in form, with a bottom and two sides, but the stern or base of the triangle is wanting.

On the high lands above Fajao d'Ovelha Point, about a quarter of a mile from the cliffs there is a church, and upon the heights, 1 mile east of Ponta Parga, another. The former is 1628, and the latter 1511 feet above the sea. The bold rocky cliffs of Ponta Parga Bluff are 935 feet high ; and the smooth round-topped hill which is situated half a mile to the eastward of the bluff is 1380.

Some rocks and large stones lie scattered around the base of Ponta Parga.

a few to the distance of 300 yards; and a ridge of rocky ground nearly $1\frac{1}{2}$ mile in extent runs out from the point to the north-west. The soundings on it are very irregular, from 11 to 19 fathoms, and 33 close to its outer end. Strong westerly winds occasion a heavy sea upon it.

From Calheta, the bank of soundings in its progress to the westward increases considerably its distance from the land, and attains its greatest breadth $5\frac{1}{2}$ miles west of Fajao d'Ovelha Point. From thence it sweeps round to the north-east and gradually diminishes. The edge of it passes little more than 1 mile south of Ponta Galera, $1\frac{1}{2}$ mile south-west of Ponta Jardim, $2\frac{1}{2}$ south-west of Paul do Mar, and 2 miles south-west of Fajao d'Ovelha. Thence it turns off to the west, and passes near the parallel of that point at the distance above stated. To the north-west of Ponta Pargo its extent is $2\frac{1}{2}$ miles.

All the bank west of Ponta Pargo and Ponta d'Ovelha is flat, with 40 to 46 fathoms over it; and from those depths it goes off very suddenly to 200 fathoms. The bottom is generally a light brown or a dark grey sand, with occasional casts of rock.

At Ponta Pargo the next point seen to the north-eastward is Ponto Tristao, bearing N. 46° E., and distant 5 miles. The coast between them is formed by a wavy line of coarse stony beach, with high rocky cliffs rising abruptly from it. Above the cliffs the land has a very steep ascent to the ridge of mountains 2 miles distant, some parts of which exceed 4000 feet in elevation. The cliffs are broken by several mountain torrents, waterfalls, and deep ravines; and there are two extensive land slips which are for the most part terraced and laid out in vineyards; and a few huts shew amongst the vines. The shore is clear, without any outlying dangers, and midway between the points, at a quarter of a mile from the beach there is a depth of 10 fathoms, at half a mile 22 to 25 fathoms, at three-quarters 30, at one mile 30 to 40 fathoms, outside 50 fathoms; the bank deepens rapidly, and the extreme edge of it is about $1\frac{1}{2}$ mile from the land. The general quality of the bottom is a fine dark sand.

NORTH COAST.—Ponta Tristao, the north point of Madeira, is a high bold bluff 1070 feet above the sea, in lat. $32^{\circ} 51' 31''$ N., and long. $17^{\circ} 12' 25''$ W. At the foot of it are a few sunken rocks which extend off 130 yards; but 240 yards north of it there are 7 fathoms, at a quarter of a mile 8, at half a mile 27, at three-quarters 36, at one mile 42, and two mile 200 fathoms, fine dark sand.

On the heights, three-quarters of a mile to the southward of the bluff, at an elevation of 1709 feet is the parish church of Magdalena

North $60^{\circ} 30'$ E., 0.86 of a mile from Ponta Tristao, and about half a mile from the beach abreast of them, is a singular little cluster of flat rocks, a few feet above the sea, named the Rochas de Rabçal. The northern one forms a crescent, its horns pointing towards the shore. Other narrow rocks fill up the space in front of the horns, leaving the centre open. In strong winds, or with any swell, the sea rolls over them with heavy breakers; but they are steep-to, with 10 fathoms within a boat's length of the surf; having no outlying dangers, and in the channel between them and the coast the greatest depth is 17 fathoms.

From Ponta Tristao to Ponta Moniz is $1\frac{1}{2}$ mile. The coast between the points consists of very high cliffs, with a narrow stony beach along their base, which is broken through by two bold rocky bluffs, the first three-tenths and the second five-tenths of a mile from Ponta Tristao. Nearly midway between *the latter* bluff and Moniz Point there is a deep break or gap in the cliffs and *Ribeira*; and in front of the Ribeira a few rocks lie out about 100 yards

from the beach. A little farther eastward, and one mile from Ponta Tristao, is a low cliffy point of very rugged black lava, with a rocky flat extending from it 70 yards to seaward; and at the extremity of this flat are numerous small detached rocks, which lie around it to about the same distance. From hence it is three-tenths of a mile to the outer extreme of Ponta Moniz.

Ponta Moniz is formed by a mass of lava running out north-east about 470 yards from the general line of coast, and looks as if it had flowed over the cliffs into the sea from the heights above them. The base of the point, which is its most elevated part, is about 420 yards broad: from thence it slopes to the outer extreme, and becomes low and narrow.

The shores of the point have a very irregular broken outline, especially on the west, where the action of the sea appears to be most violent and the most continued. The cliffs on that side are of a steep iron-bound character, sharp and craggy, and have several rocks lying at their base. On its eastern side, about 160 yards from the extremity of the point, there is a small fort, having a circular tower at its entrance, which is built close to the shore on a little rocky bluff. On either side of it are detached rocks; and right off the bluff are four others lying in a straight line with it. Alongside the outer one there is a depth of 9 fathoms, 140 yards south-west of this is another rocky point, and another round tower, at which is the best landing, as at a jetty, with $4\frac{1}{2}$ fathoms close up to it. Here the low rocky cliffs terminate, and beyond is a sloping shore of rock for about 120 yards, on which the fishing-boats are hauled up. A narrow coarse shingle beach succeeds, with high bold rocky cliffs towering above it to the Janellas.

The town of Moniz is situated on the higher part of the point, the chapel being about one-third of a mile from the landing-place; but there are several small detached dwellings on other parts of it, and nearly the whole point is covered with stone enclosures, and devoted to the cultivation of the vine. A tedious zigzag road leads from the town to the height above it, where there is a village and some good farms.

In front of Ponta Moniz, at the distance of 120 yards, is an islet bearing the same name, composed of yellow tufa, resting on black lava. It measures nearly 300 yards from east to west; about 110 from north to south, and is 205 feet in height. Its shores are precipitous, and its summit, which is difficult of access, is the favourite resort of sea-fowl. The soundings off it are deep, and there are 16 fathoms close up to it. The channel between the point and the islet is obstructed by a large black mass of rock of some elevation, and by various smaller ones, both above and under water. The bank of soundings on the meridian of Ponta Tristao extends off 2 miles from the land; but after passing the Rabaçal Rocks it turns to the south-east, and becomes more contracted, approaching within 0.65 of a mile of Ilheo de Moniz, and continuing to the eastward about the same distance from the Janellas, and nine-tenths of a mile from Ponta Seical.

The little bay, locally designated Porto Moniz, has much foul ground in it from Moniz Islet along its shore to the eastward, for the distance of half a mile, or half its extent, and to about a quarter of a mile off the beach. It is in fact a rocky bank, varying in depth from 2 fathoms near the shore to 10 on its margin; and outside 10 fathoms; the quality of the bottom generally is fine dark speckled sand.

On the summit of Ilheo de Moniz, Tristao low extreme point bears N $87^{\circ} 55'$ W., and is distant $1\frac{1}{4}$ mile; and Ponta San Jorge, the extreme point seen to the eastward, bears S. $81^{\circ} 41'$ E., distant $13\frac{1}{4}$ miles. In this latter space the coast forms a bay, which at St. Vincente is $2\frac{1}{4}$ miles within the points.

The first objects to the eastward which attract attention on quitting Point Moniz, are a group of rocks named the Janellas, lying near the outlet of that Ribeira. They are five in number, and the outer one, which is largest, bears from the summit of Moniz Islet. S. $41^{\circ} 41'$ E., distant one mile. Like that islet it is composed of yellow tufa upon a base of black lava, and is about 183 feet in height. The top of it is covered with coarse grass; 70 yards eastward of it is a breaking rock surrounded by deep water; 100 yards west of it is a high narrow shaft of naked black lava, with a hole through it, which, viewed from the north-east, appears like a lofty column; the three other rocks lie near this on the south, and are small and low, the inner one about 60 yards from the beach. The two largest rocks are steep-to, at their north end, having 11 fathoms within 50 yards of them, and there are boat channels between them all.

From Ponta Moniz the north coast of Madeira is generally high, and bordered with lofty cliffs. It is visited by but few vessels, there being no ports or harbours capable of affording shelter; it is consequently unnecessary to add a description of it.

Winds, &c.—Prevailing winds, 1843.—January used to be a very boisterous month, with winds from the S.W., but for some years past N.E. winds have prevailed. Rain is frequent on the north side of the island, while in the Bay of Funchal it is fine and clear.

February had also a prevalence of southerly winds; but for the last seven or eight years they have been northerly, shifting at times suddenly to E. and E.S.E., so that no dependance can be placed upon them. These sudden shifts of wind are frequently followed by gales of short duration, accompanied by thunder and heavy rains.

In March the winds generally prevail from the N.W., and at times blow very hard, not dangerous to vessels at anchor in the bay; but occasioning a high surf on the beach, which renders the shipment and landing of goods very difficult. Sometimes in this month there are heavy falls of snow on the mountains.

April has often windy weather, extending into the middle of the month (though it is more usually fine from its commencement), and the heights are occasionally capped with snow.

May, June, and July have generally clear nights and cloudy days; with regular land and sea breezes.

August and part of September are clear hot months, subject to L'Este, or Sirx winds, which blow from the east sometimes in considerable strength, for 6 to 9 days consecutively; and while they blow there is a particularly dry and cloudless atmosphere.

In October, towards the middle of the month, the periodical rains may be expected, which continue generally about 14 days. They frequently commence with strong S.E. winds, which veer to the S.W., and round to N.W.: when it clears up and becomes fine. St. Martin's summer succeeds to these, and extends usually over the same period of time, accompanied by N.E. winds. There is, however, much irregularity about this St. Martin's summer, for it is sometimes delayed to December.

The N.E. trade wind sets in about the middle of April, and continues until the end of September.

So far as we could learn from enquiry, no gales occur here from the middle of April to near the close of September; and they are principally to be apprehended in November and December, commencing a few points on either side of south, then gradually veering round to the westward, and terminating in the N.W. During summer, when the land and sea breezes prevail, it requires

the exercise of some judgment to get to the anchorage ; and the time of day must be borne in mind.

The sea breeze from S.W. to W.S.W., sometimes yet more westerly, sets in generally from 9 to 10 in the morning, and towards evening it gradually dies away. About 9 or 10 at night a gentle land wind springs up, which in its turn subsides towards the morning ; leaving between these intervals of 4 to 5 hours calm.

At the season of the year above referred to, the N.E. wind blows fresh up to Cape Garajao, and continues on that direction past the cape ; leaving Funchal Bay, and a large space to the westward of it in calms, or baffling, or light land winds.

If then a vessel reach Cape Garajao too late to avail herself of the land wind, and too near the time when the sea breeze may be expected, she should give the cape an offing of 2 or 3 miles, and keep to the westward in the stream of the N.E. wind, until she brings Funchal to bear about north. She may then haul in for it, and will soon pass into calm, and shortly after the sea breeze springing up, will carry her under studding sails to the anchorage.

If she reaches Cape Garajao when the sea breeze is nearly over, she may keep near the head for the advantage of the coming land wind ; and may often derive great assistance from her boats : men-of-war especially may tow into the anchorage during the calms, or land winds, of the night and very early morning.

The land wind comes off usually earlier, and continues longer after rains ; and the sea breeze sets in earlier and more steadily during a continuance of fine dry weather, even a few partial showers sensibly affect this.

When the vessels can be seen at anchor in the bay, an intelligent commander may derive some advantage from observing the way they are tending.

The best time to leave the Bay of Funchal is, with the first coming of the evening land breeze.

It need scarcely be observed that when vessels pass Point Lourenço, with winds from north round to the westward, they should be prepared for strong gusts from the Ravines.

During the winter months every care should be taken to watch the indications of the weather, the swell into the bay, the drift of the clouds, &c., and it will be advisable if these are unfavourable to quit the anchorage before real difficulties arise ; for, when they do, they are quick and violent.

The tidal wave strikes these islands nearly at the same time as the Azores ; the flood running N. 30° E., at about 1½ mile per hour on springs ; and between the narrow channels of the islets, and off Point Lourenço it is sometimes 2 miles per hour.

DESERTAS.—These are three rocky islands off the eastern point of Madeira, from which their northern extreme bears S. 34° 8' E., and is distant 10 miles. The northern island is named Chao ; the centre one Deserta Grande ; and the southern one Bujio. They have no permanent inhabitants, but are occasionally visited from Madeira by fishermen, herdsmen with goats, sheep, and cattle ; and by parties in quest of orchilla.

From Madeira east point, a bank of soundings extends quite across to Chao ; and is about 2 miles wide in its narrowest part. The depth of water along the middle of it, until you draw near the land, ranges from 45 to 75 fathoms ; and in moderate weather, fishing-boats may frequently be seen at anchor there. This bank continues entirely round the Desertas, its southern limit being 1½ mile from their S.E. extreme point.

Chao is 9.10ths of a mile in length, and one-quarter of a mile in breadth, at its north end ; but, at the south, it terminates in a very narrow point, from

which some rocks run out S. 35° E., about 200 yards. It is a tabled land, surrounded by high rocky cliffs. Off the bold bluff, at the north extremity of this island, in lat. 32° 34' 47" N., and long. 16° 32' 38" W., there stands a remarkable detached rock, named by the Portuguese fishermen the Furrilhao, but better known by navigators as the Sail Rock. It lies due north of the point, distant from it 100 yards; and is a mere column 160 feet above the sea. There is deep water close around it; but 300 yards outside of it, bearing N. 65° W., there is a breaking rock; and a narrow ridge of irregular soundings, varying from 11 to 19, 16 and 14 fathoms over rocky ground, extends from it N. 30° W., nine-tenths of a mile. The north-west extremity of Chao, also a high, bold bluff, has several large rocks scattered about the base of it, some above, others under water; and there is foul ground to the north, the west, and to the south-west of it, for the space of two-tenths of a mile.

The eastern shore of the island runs nearly in a straight line. The western coast is more indented, and on that side, about one-third of its length from the south point, in a small cove, named Santa Maria, will be found the best landing, and the place of easiest access to its summit.

The surface of the island is composed of light soil, mingled with rocks and stones; and at the period of our visit (the middle of May) it was covered with long, coarse, dry grass, and some wild herbs, amongst which the wormwood was abundant. Near its centre was a pond of turbid water, apparently preserved for the animals which sometimes pasture there, when the grass is verdant, but at this time none were found upon it. The most elevated land on Chao is 336 feet above the sea, and is situated 340 yards to the southward of the north point.

The *Deserta Grande* is the largest and most elevated of the three islands; its shores are generally steep and rocky, and high bold cliffs of rock characterize the greater part of them. It is 6 33-100ths miles in length, by 1 in breadth, at Ponta de Pedregal, which is its widest part. From the high land, lying due east of this point, in the interior of the island, there is one continuous rocky chain of heights to the south point. To the northward of these high lands, it has a very different formation, there being a double ridge of high lands. The valley lying between them is drained by a water course running along the bottom of it, over a rocky bed (quite dry in May), the outlet of which is over the eastern cliffs, about half a mile from the north point of the island. This water course is turned thus to the eastward by two hills, standing on the N.W. side of it, near the outlet; and the rain water which falls on these hills makes its way to the sea, down a steep ravine, also running to the northward, and terminating very near the north point of the island, on the west side. This circumstance is particularly mentioned because we found the summit more easily gained from this part than from any other, although the ascent up the dry and rugged bed of the mountain torrent was sufficiently difficult.

The head of the valley lies at the foot of a green hill, near the centre of the island, and about east of Ponta de Pedregal; and, it may be useful to the navigator to know that, there he will find a small house, and near it two ponds or reservoirs of turbid water; and a few yards from the house, down the valley, a spring of delicious cool water, yielding, however, but a very limited supply. There had been a garden attached to the house, but it was neglected and overgrown with weeds. The soil of the green hill, and all the head of the valley was a deep red earth. A few cattle, some goats, and numerous sheep were found upon the heights; and there were twenty persons from *Madeira* attending them, and collecting orchilla. These people sometimes

land on the little Point Castanheira, half a mile to the northward of Ponta de Pedregal, and climb to the top of the island up broken cliffs; and when the wind is westerly, they scale the heights from the east side; but much skill and local knowledge seem requisite to accomplish it.

The most elevated peak of Desertas is a rocky hill, standing on the ridge of high land, which may be termed the spine of the island. It bears S. 68° E., 1 1.10th mile, from Ponta de Pedregal, and is 610 feet above the sea. From the north point of Deserta Grande to the rocks which extend from the south end of Chao, the distance very little exceeds 300 yards, and this channel is narrowed by a breaking rock in the middle of it, lying north from the point. Another breaking rock lies a few yards from the N.E. point of Deserta Grande, so, that, although, at low water there are passages of $2\frac{1}{2}$ fathoms in the channel, yet, it is only practicable for boats in fine weather; and there are times when the breakers extend entirely across.

From the top of the high land at the south point of Chao, the rocks at the bottom of this channel may be distinctly traced at low water. From the north point of Deserta Grande, proceeding along its western coast, the next point bears S. 5° W., half a mile. It is formed by several rocks and large stones. S. 6° E., one mile 45-100ths farther is *Ponta de Pedregal*, a detached rock, with high land towering above it to more than 1200 feet. Between these two points is the little cove of Castanheira, where, as before stated, the boatmen sometimes land to climb the heights. A rock stands off and marks the point.

From Pedregal the outer rock off Ponta de Boqueirao, the south extremity of the island, bears S. 30° E., $4\frac{1}{2}$ miles. The rock has a few stones on its west and south sides, but close to it: the point is steep-to and clear of dangers; and so is the whole western coast, which consists of high broken cliffs, with here and there a large fragment fallen at its base. Between Pedregal and Boqueirao Points, these cliffs fall back half a mile from the line joining the extremes, and convey to the eye an idea of greater depth of bay than is really the fact.

At Ponta de Boqueira the coast turns to the north for eight-tenths of a mile; thence N. $13^{\circ} 30'$ W., 1 85-100ths mile to the short stony point of Rocha Negra: on the north side of which are several rocks and stones, with shoal water, half a mile along the shore, and to the distance of about 300 yards off it. A small stony point lies half way between these two last, but the borders do not extend off 100 yards.

From Ponta de Rocha Negra, the next point northward bears N. 29° W., $2\frac{1}{2}$ miles. This is also a short stony point, and like the Rocha Negra, is apparently formed by fallen portions of the cliffs above it. From this last point to the N.E. extremity of the island is N. 35° W., $1\frac{1}{2}$ mile. Two black rocks lie immediately off this point, and the breaking rock formerly mentioned a few yards north of the outer one. The general character of the east coast of Deserta Grande is that of a rugged, broken, irregular line of cliffs, having, in many cases, slopes from them to the stony points which originate in occasional land slips from these cliffs.

The Bugio.—From Ponta de Boqueirao, the south extreme of Deserta Grande, the north point of Bugio bears S. 5° E., distant 67-100ths of a mile. Both points are clear, and have 7 fathoms water within 30 yards of them. The channel between them is perfectly free from dangers. The deepest water in it is 19 to 20 fathoms; the quality of the bottom varies, being fine brown sand, coral, and shells, and rock.

The Bugio from its north point along the west coast to the southward runs nearly 1 7.10ths mile; thence S. 23° E., 1 65-100ths miles, to a conical de-

tached rock ; and thence to Ponta d' Agulha, its south extremity S. 63° E., 1 1-10th mile. A few rocks lie around this very point ; but there are 5 fathoms 130 yards off, and at 200 yards a depth of 10 fathoms. It is in lat. $32^{\circ} 23' 15''$ N., long. $16^{\circ} 27' 37''$ W.

From Ponta d' Agulha the north point of Bugio bears N. $21^{\circ} 30'$ W., 4 5-100ths miles. The coast between the extreme points on the east side forms a crescent half a mile in depth. Both shores are rocky cliffs of less altitude than those of the Deserta Grande surmounted by a sharp serrated rocky ridge of hills, which runs the whole length of the island. There is a gap on this ridge near the centre of it, which at a distance gives the appearance of two islands. The beaches on opposite sides of the gap are not more than 200 yards apart. Its greatest breadth nowhere exceeds half a mile.

The highest peak on the northern part of the Bugio is 1349 feet above the sea : that on the southern part is 1070 feet.

The direction of these islands from the Sail Rock to the south point of the Bugio is S. $20^{\circ} 28'$ E. and their whole extent is $12\frac{1}{2}$ miles.

The bank of soundings around these singular islands is tolerably regular ; sweeping across to them in a narrow ridge from Maderia as already stated, it extends along their eastern shores to the averaged distance of $1\frac{1}{2}$ mile from the land ; and along most parts of their western coast to the distance of 2 miles.

Its greatest breadth is west of Bugio where it runs off 3 miles ; on the south it passes the extreme point at the distance of $1\frac{1}{2}$ mile. The bottom is diversified with fine sand of various colours, brown, white, and grey ; coral, broken shells, and rock.

There is much danger to vessels passing close under the lee of these islands with strong breezes, in the violence of the gusts from the high land which are most variable, both in direction and strength. It is no uncommon thing to see the water whirled into the air, and then precipitated on the vessels' masts and decks.

The tide sets by these islands at the springs at the rate of $1\frac{1}{2}$ to 2 miles per hour ; the flood N. 31° E. ; the ebb S. 31° W., and its rise is 7 feet.

PORTO SANTO.—This island lies to the north-eastward of Madeira, and is a dependency of that island ; it is about $6\frac{1}{2}$ miles in extent, and stands upon an extensive bank of soundings. If from Europe and bound to Madeira, it is recommended to make this island, and then steer to the south-westward, as by adopting this plan you will be certain of the exact course you ought to adopt. The island is said to present a somewhat remarkable aspect, and to be easily recognised by its appearing as three large high hummocks, which are visible in fine weather 20 leagues off. It has on its south-west side a roadstead equal in many respects to Funchal, where there is a neat little town affording refreshments, and plenty of water.

With the exception of a few pines and palms, Porto Santo is destitute of wood, not even producing brushwood, consequently the inhabitants are obliged to depend on Madeira for fuel. This island is used as a place of exile for prisoners from Madeira ; and there is a regular commercial communication kept up between the two islands by large boats. Between Madeira and Porto Santo the prevailing wind is from the N.E.



Porto Santo distant 14 miles.

The following description of Porto Santo by Captain Vida tracted from the *Nautical Magazine*, 1848* :—

“The north-eastern part of Porto Santo consists of numerous mountains, some of which are nearly 1,700 feet in height, wⁱ upon their sea-board; and all its northern coast is character. rocky cliffs generally inaccessible, with rocks, some above and water, lying along their bases.

The central part of the island, though considerably less elevated than the extremities, is high near the cliffs of the north and north-west coasts, where in some places it is 700 feet above the sea. From thence it slopes to the southward, and terminates in a beautiful white sandy beach, which forms its entire south-eastern shore. On this central part are several sand fields covered with what appear to be fossil heath stems; a remarkable feature, which has excited the attention of naturalists who have visited the island from Madeira. Various conjectures have been formed as to their origin; but it would seem most probable that they are coral formations.

The south-western end is also rocky and elevated, some of the hills exceeding 900 feet in height; and one peak near it, named Anna Fereira, is distinguished by the columnar structure of its summit.

The *town* is situated near the centre of the bay, about 300 yards from the beach, the church and court-house are conspicuous in it; and a little to the westward of them is a small battery, and the residence of the military commandant. In this battery observations were made to determine the geographic positions of the island, and they place it in $33^{\circ} 3' 30''$ N., and long. $16^{\circ} 20' 14''$ W.; the magnetic variation in 1843 was $24^{\circ} 30'$ W.

At a mile, N. $4^{\circ} 30'$ E., from the church there is a pointed hill, the Pico do Castello. Upon its summit, 1,447 feet above the sea, are the ruins of several water tanks and long stone buildings. Cordeyro states it to have been used as a stronghold, to which the inhabitants retired on occasions of hostile invasion by the Spaniards during their disputes with Portugal. The two peaks immediately to the eastward of Castello, called Fachio and Gaudaya, are the highest on the island; the former having an elevation of 1,660 feet.

The largest portion of the island is employed for pasture; the part devoted to agriculture extends principally along the shore of the bay, and over that tract of comparatively low land lying between the heights of the N.E. and S.W. points, though much of it is sandy, dry, and barren; and the whole island suffers grievously from a deficiency of water. It produces wine; and most varieties of grain and vegetables in general use; also oranges and other fruits common to its latitude; but it is remarkably destitute of trees. Live stock and poultry are plentiful.

The island fishermen are few in number; yet the sea around its shores abounds with fish. One of the best fishing-banks is off the south point of Ilheo de Cima; and in the early part of summer it may be seen crowded with fishing boats from Madeira.

To Madeira there is a considerable annual export of limestone from the quarries of Ilheo Baixo; it is carried in open boats and gives employment to the boatmen of both islands.

The landing at Porto Santo is usually made upon the beach in front of the town, where some fishing-boats and others of larger dimensions used for commercial purposes are hauled up; but there is no pier, nor does any attempt appear to have been made to facilitate the communication with the

* The bearings in this description of Porto Santo are true bearings.

tack-fore. It is high water here at full and change at 12h. 50m.; and the rise of tide is 7 feet.

Generally vessels should not anchor in the bay within the line joining the south extreme point of Ilheo Baixo, and the low extreme of Ponta do Incao, bearing S. $49^{\circ} 30'$ W., and N. $49^{\circ} 30'$ E.; but there is convenient anchorage near that line, with the church N. 48° W., and the south point of Ilheo de Cima, N. 73° E., 2 miles distant. In this position, which is $1 \frac{3}{10}$ ths mile from the landing-place, there will be 17 fathoms water over a bottom of small gravel and broken shells. The edge of the bank is something less than half a mile to the southward of it, and the depth of water increases rapidly.

During the settled weather which usually accompanies the summer months, vessels may anchor nearer to the shore; but care should be taken to avoid being caught in the bay, when it is not settled, for southerly winds of any strength throw a high sea into it. In the present condition of the island it is of little service to the navigator, since any supplies it can afford may be more conveniently and expeditiously obtained at Madeira.

Ponta do Incao, the south-east point of Porto Santo is composed of high rocky cliffs, surmounted by pointed hills. At the base of it is a small low rocky point, and several detached rocks.

The Ilheo de Cima lies off the point S. 56° E., two-tenths of a mile. The narrow channel between the point and Ilheo is studded with rocks, some above, some under water; but there are two boat passages in it, the one close to the south side of a large rock off the point, the other close to the island.

Ilheo de Cima may be termed a table-land, although it is not strictly so, there being a small elevation near its eastern cliffs, 360 feet above the sea, sufficiently marked to furnish a station in the survey.

The island has a broken coast line of rocky cliffs with a small cove at its north-east side, where, when the water is smooth, a landing may be effected. From thence a sort of goat track leads to its summit, on which there is some loose stony soil. Its general direction from the N.W. to the S.E. point is S. 62° E. It is six-tenths of a mile long, one quarter of a mile broad; and, except at the north-west point is every where steep-to.

From the south-east point of Cima the bank of soundings extends off east seven-tenths of a mile, S. 87° E., 2'.46, and south 1'.2, and terminates in a narrow point. Much of it is coarse ground coral and broken shells; and it is held in great estimation as a fishing-station by the boatmen of Madeira, as well as those of Porto Santo.

N. 11° E., one mile, from Ponta do Incao is Ponta dos Frades, a bold point steep-to, with the Pico do Conselho half a mile inland of it. Between these two points is the small sandy bay of Porto dos Frades, and in it the Ribeira, which discharges the waters from the adjoining hills. The land is composed of broken rocky cliffs, with a few rocks scattered along them near the shore. A large round rock, named Penedo Redondo, lies off Ponta dos Frades, bearing from it S. 48° E., distant 300 yards. This rock is a few feet above water, and everywhere steep-to; having 10 fathoms alongside it. The bay formed by Ilheo de Cima, and Ponta dos Frades has generally a sandy bottom. The edge of the bank of soundings is three-quarters of mile east of this point.

From Ponta dos Frades the East point of Ponta Branca lies N. 8° W., $1 \frac{1}{4}$ mile. The land between these points falls back about four-tenths of a mile, comprising the valley between Pico do Conselho and Pico Branco, and near the centre of the bay is a small sandy beach through which the waters of the Ribeira, which drains the valley, find their outlet.

Ponta Branca is really composed of three bluffs; the southern one has a few large stones lying off it to a distance of 200 yards; the northern bluff of the Ponta is a little more than three-tenths of a mile, N. 35° W. from its eastern bluff, and forms a fine bold promontory, the peak immediately over it being 1,390 feet above the sea.

Three rocky islets lie off Ponta Branca; the first bearing from the northern extremity of the bluff N. 64° E., three-tenths of a mile, is named Rocha do Pescador. It is about 470 yards in length, by 270 in breadth, with a broken coast above of rocky cliffs. There is a peak at its north side 358 feet in height; and the whole summit of the islet is covered with trees. The second islet, named Roche de San Lourenço, bears from the peak of Pescador N. 12° E., 0'62; it is very small, a mere cluster of rocks with a few trees upon them, 38 feet above the sea. The third and outer islet is Rocha de N.E., bearing N. 5° E., 0'6 from San Lourenço. It is nearly the same size as Pescador, and like that islet its coasts are composed of steep rocky cliffs of very irregular outline; it is thickly wooded, and near the centre of it is a peak 330 feet high.

The islets are all steep-to with navigable channels between them. They stand on a rocky bank of unequal soundings, which extends more than a mile to the N.N.W. of the outer islet. The least water found upon it was 10 fathoms. This rocky patch bears from the peak of Rocha de N.E., N. 82° W., distant 2'3 miles, and is on the meridian of Ponta Branca.

The edge of the bank to the east of the islets runs nearly parallel with them at the distance of only half a mile; and after passing the northern one it trends to the north-westward.

N. 73° W., 1 4-10ths mile from the north extremity of Ponta Branca is Ponta da Cruz. It is rather a sharp salient point; and north of it, one-tenth of a mile is a curious crescent-formed rock, a few feet above the sea, its convex side facing westward.

Between these points are two small bays; the first extends from Ponta Branca to the bold head of Ponta de Ninho de Guisoxe, off which latter about 250 yards lies a breaking rock; the second bay is west of it; both are full of little rocky points with large stones at their bases, none of them, however, extending more than 100 yards from the cliffs. Directly inland of Ponta da Cruz, about nine-tenths of a mile to the south, is the remarkable sharp-pointed peak of Juliana. It is columnar or basaltic, and rises 1,492 feet above the sea.

At Ponta da Cruz the coast trends to the south-westward. The next extreme that comes to view is Ponta da Fonte, bearing S. 60° W., and distant 1 7-10ths mile. The fountain, from which it takes its name, is situated near the summit of the cliff, three-tenths of a mile to the S.W. of the point. The intermediate coast consists of high cliffs, much broken into coves, and little points as usual, studded with rocks along their base.

Ilheo da Fonte lies one mile N. 56° W. from this point. It is black, of basaltic structure, and terminates in a comparatively sharp peak 270 feet above the sea. At its base, it is about 270 yards in length, by 100 in breadth. It is steep-to, with a clear channel between it and the point; the deepest water being towards the islet; but the bottom is almost all foul ground. Vessels may pass on either side of it, at a distance of 200 yards, in 18 fathoms.

Ponta Varadias is the next point westward of Fonte, from which it bears S. $54^{\circ} 30'$ W., distant 1 2-10ths mile nearly. The southern extremity of the point lies S. $35^{\circ} 30'$ W., half a mile farther, and both extremes are, like the intermediate coast, composed of high rocky cliffs. The hills above this

double point are covered with sand; and on their summits are found those curious fields of fossils, resembling petrified stems of heath, before alluded to. S. $26^{\circ} 30'$ W., 2'.33 miles beyond the southern point of Varadias, is the double-headed point of Furado. The point forms two spurs, the one running north, the other S.W., and they are considerably lower than the cliffs on either side of them. The coast between Furado and Ponta Varadias, preserves much the same character as that eastward of the latter point, viz.:—high broken rocky cliffs and coves, with large rocks and stones at their bases.

Ilheo de Ferro is of a triangular form, and its sides are about half a mile in length. The coasts consist of rugged, and almost inaccessible rocky cliffs, above which is a scanty soil, covered with coarse grass. The most elevated land upon it lies near its north coast, and is 380 feet above the sea. A ledge of flat rock extends from the east point, towards Furado. The channel between them is 330 yards wide, and has no danger in it. On the west of the islet, there is deep water alongside the cliffs; soundings extend from them seven-tenths of a mile to the edge of the bank.

Ponta Furada is the west point of Porto Santo, and from thence Ponta Malhada bears S. 27° E., distant five-tenths of a mile. The land above this point rises to the height of 890 feet; and the coast between the points is high, rocky, and steep-to.

From Ponta Malhada, Ponta da Calheta bears S. 50° E., distant 0'.92. In this space the high cliffs are much broken into rocky coves, and as you approach the latter point, there are numerous small rocks close-to the shore.

At Ponta da Calheta the cliffs terminate, and are succeeded by a low sandy beach, fronted by stones and sunken rocks, which latter extend to some distance round the point.

Ilheo Baixo lies to the southward of Ponta da Calheta, its northern extremity being about 430 yards from the point. The channel between them is much narrowed by the rocks projecting from Ponta Calheta, to the S.W.; and by a small bank, running out from Baixo north point, to the eastward; so that the clear outlet lies east and west, and may be about 130 yards wide. In moderate weather it is a safe boat-channel.

Ilheo Baixo is $1\frac{1}{4}$ mile from north to south. Its greatest breadth near the centre is seven-tenths of a mile, and it is surrounded by high rocky cliffs, everywhere steep-to, except at the north point. On the south-west side of it are two small rocky bays, and its whole coast line is very irregular. On the west side of the island, close to the southward of the rocky head, which forms the north point, there is a cove much used during the summer months by the boatmen of Madeira, who resort to this island for the limestone with which it abounds.

The presence of this mineral on so small an islet is remarkable; the more especially as it is not found either on Porto Santo, the Desertas, or Madeira; a small spot, in the valley of San Vincente, on the latter island excepted. It is quarried from veins, forming galleries, like coal mines, which, however, are entered from the sides of the cliffs.

Viewed from east or west, the island presents rather a tabled summit, having a little hummock near its northern end, 570 feet above the sea. This islet was formally declared national property, on the 7th of November, 1836.

The edge of the bank of soundings sweeps round the south point of Baixo, six-tenths of a mile from it to the S.E. At due south, about seven-tenths of a mile, and at S.W. nine-tenths, and the depth increases rapidly outside 40 fathoms. The lead indicates rocky bottom, generally, in the vicinity of Baixo, with occasional casts of fine white sand.

From Ponta da Calheta, Ponta do Incao bears N. $63^{\circ} 20'$ miles. The coast line between them is formed by a beautiful beach, which falls back into a bay, about eight-tenths of a mile the straight line through the extreme points. A few rocks lie at or very close to it, from Ponta Calheta to nine-tenths of a mile. They terminate a short distance to the eastward of Anna Ferreira, a remarkable summit of which is 910 feet above the sea.

On the east side of the bay there are also rocks scattered along the coast from Ponta do Incao to the distance of 1 4-10ths mile westward, and in the meridian of Pico Mazarico, they extend off shore two-tenths of a mile. Between these is an uninterrupted line of white sandy beach.

The edge of soundings, after sweeping round Baixo, so narrows the bank that, when the peak of Anna Ferreira bears N W., it approaches within three-tenths of a mile of the beach. Thence it runs eastward, and with the town bearing north, its edge will be found 1 4-10ths mile from the shore. It continues this easterly direction to the meridian of the north end of Ilheo de Cima, and then turns south-easterly to the extremity of the narrow fishing-bank, extending from the S.E. end of that island. Fine white sand is the general character of the soundings over the bay; but casts of coral, shells, and gravel occur.

From the N.W. coast of Porto Santo, the bank of soundings extends off 8 miles, and from Ilheo de Fonte, its northern extreme, lies about N. 25° W., $6\frac{1}{2}$ miles. Its general depth is from 25 to 35 fathoms fine white sand, with frequent casts of rock, coral, shells, and gravel.

Near the north-eastern margin of this branch of the bank is the Falcon Rock, a mere knoll, on which there are $4\frac{1}{2}$ fathoms at low water. It stands on a rocky patch, three-tenths of a mile long, and two-tenths broad, on which are 11, 15, and 17 fathoms; and the sea is said to break heavily on it in stormy weather; but this we did not witness. When upon this rock, the highest land of Rocha de N.E. (the outer islet off Ponta Branca), bears S. 60° E., 6.23 miles; of Ilheo de Fonte S. $30^{\circ} 10'$ E., 4.6; and of Ilheo de Ferro, S. $5^{\circ} 30'$ W., 8.4.

Vessels coming from the N.E., with a fair wind, may pass it, keeping the Ilheo de Fonte in line with the high land, at the S.W. end of Porto Santo.

On the east side of it, the edge of soundings is half a mile distant. On the N.E., only three-tenths of a mile. N. 37° W., nearly nine-tenths of a mile from the Falcon Rock, is another rocky patch of comparatively shoal water, which has been named after the vessel by which it was explored, the "Styx Bank." The least water found upon it was 11 fathoms, with casts of 17, and 20 fathoms. Like the Falcon Rock, it is situated near the eastern margin of soundings, there being 100 fathoms about three-tenths of a mile to the east of it, in which direction the bank deepens suddenly from 28 fathoms to 100. To the north of it the soundings extend one mile, and deepen rapidly from 45 fathoms; and to the west of it they run off $2\frac{1}{2}$ miles.

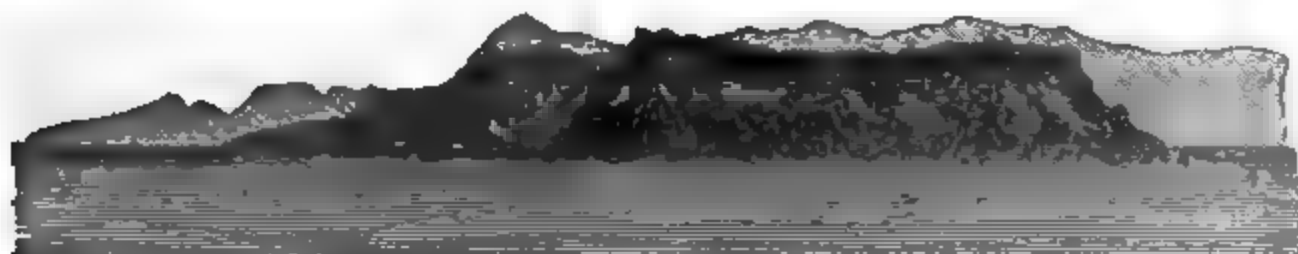
The edge of soundings then runs to the southward in a waving line, towards Ilheo de Ferro. The whole bank is composed of sand, much interspersed with rock, coral, broken shells, and gravel. The sand is generally white and fine; but, some of it is speckled with red, and coarse sand occasionally occurs."

THE SALVAGES.

These are a group of islands lying 156 miles from Funchal, between Madeira and the Canary Islands. Although but of small extent, they are inhabited; but the inhabitants are very poor, and with difficulty obtain a subsistence. It is usual to avoid these rocky islets when sailing in their vicinity, as there is nothing to repay a visit, and access to them is very dangerous on account of outlying dangers.

GRAND SALVAGE.—The principal island of the group, named the Grand Salvage, is about a mile in extent, and can be seen 16 to 18 miles off, and when viewed either from the northward or southward appears in two distinct hills. The shape of this island is very irregular, and its cliffs being high, abrupt, and bordered with many rocky reefs, renders landing very dangerous. To the N.W. of the island about a mile there are several rocks and breakers; some sunken rocks also lie off to the West and N.E. about the same distance; in other respects the island is clear and may be approached with safety to the distance of 2 miles. Most of the dangers show by the sea breaking on them.

The irregular form of the island presents several small bays, the most accessible of which is on the eastern side, where, with a little difficulty, a landing may be effected close to the south-east point of the island. In this bay the depth is from 7 to 40 fathoms; but there are several patches of $2\frac{1}{2}$ to 3 fathoms to be avoided. The west and south bays of the island do not appear to be so convenient.



Salvage Island, bearing N. 5° W.

THE PITONS.—To the W.S.W. of the Grand Salvage about $8\frac{1}{2}$ miles are two islands, named the Pitons or Little Salvages, the largest of which is nearly 3 miles in extent from N.N.E. to S.S.W., and has in its centre a peaked hill very ragged at the summit. From this hill the land declines in height towards the extremities of the island so unevenly, as to give the island the appearance of being composed of several islets when seen from certain positions at a distance of 5 or 6 miles. The width of the island is about one mile. When seen at a great distance off it is said to bear some resemblance to a sail.

At about a mile from the western side of the Great Piton is the Little Piton, which is about three-quarters of a mile in extent, and of but moderate elevation. On its eastern side is a large rock, named *L'Enfant Perdu*, upon which the sea breaks with violence.

These islands are surrounded and connected together by breakers which extend $1\frac{1}{2}$ mile to the westward of the lesser isle, so that is very difficult if not impossible to approach them for the purpose of landing; consequently such an attempt should be avoided. Between the Pitons and Grand Salvage there appear to be no dangers; at least such were not found when the islands were examined in 1841 by Lieut. Kerhallet of the French Navy.

Between Madeira and the Canaries the current runs to the S.S.W. at the rate of a half to about 6-10ths of a mile per hour. If steering from Funchal to Tenerife or any of the Canaries, the course should be South (*true*), in order to avoid the Salvages, which are very dangerous, particularly in the night-time. After passing their parallel the course may be changed at convenience. If during the months of December to February, when the prevailing winds are from South, S.W., and West, you are not able to pass them to the westward, you may safely run to the eastward of them, only being careful of the outlying dangers, and not to approach them nearer than 2 miles.

The currents in the vicinity of the Salvages are very variable, running to the S.S.W., S.S.E., and even S.E. at the rate of a half to one mile per hour. In passing them it will, therefore, be necessary to be careful of their drift.



Piton Islands, bearing N. 85° W.

THE CANARY ISLANDS.

This is a group of islands lying between the parallels of 27° 30' and 29° 30' North latitude, and the meridians of 13° and 18° West longitude. They consist of the following large islands:—Palma, Hierro or Ferro, Gomera, Tenerife, Gran Canaria, Fuerteventura, and Lanzarote. There are also some smaller islands, as Graciosa, Allegranza, and Santa Clara. The coasts of the islands are high and precipitous, but here and there broken by deep clefts. The mountains generally rise towards the centre of the islands, bleak and bare, and are full of pointed rocks. During the winter there is snow on several of the highest summits. The Peak of Tenerife, a half extinct volcano, rises to the height of about 12,180 feet, and as it is viewed from the sea at a distance, seems to spring out of the water like a sugar-loaf. They are all of volcanic formation, and in parts exceedingly fertile; they produce grain and fruits, both tropical and European, in abundance. An active trade is kept up among the islands, and they have large fisheries on the African coast. There are no close harbours, the anchorage being generally open roadsteads, few of which can be considered safe, except during the fine season. The depth of water between the islands is very great, and the passages are good. Supplies of provisions, &c., may be obtained from any of them, though some of the islands are without water, and depend on rain, which is kept in tanks. Each island has its governor; but the whole group is under a governor-general, who commonly resides at Tenerife, though all the law courts are held at Canaria.

The climate of the Canary Islands is healthy. The only bad months in the year are November and December, which are wet and stormy; fogs also prevail at this time, and S.E. gales are strong and cause heavy and dangerous seas, especially in the narrow channels separating the islands. In consequence, at this season of the year, the bays which are exposed from S.E. to S.W. are extremely hazardous, and should if possible be avoided. In January the weather becomes finer, and in February the summits of the

higher mountains are said to become covered with snow. At this season of the year, although the more elevated parts of the islands are cold and subject to slight frosts, yet the lower lands enjoy a moderate and agreeable temperature, not too cold or too warm to interfere with health. During the remainder of the year the prevailing winds are from the N.E., and there are land and sea breezes; the former never extending much from the land, commence at 10h. in the evening and cease at 8 or 9h. in the morning; there is then an interval of calm until the sea breeze commences. In the channels, the wind which is usually from N.E. to N.W., is very strong as soon as you are out of shelter of the land, and maintains a course corresponding with their directions.

All the channels between the islands are safe, and contain no dangers, although such have been reported to exist between Tenerife and Gran Canaria.* All known dangers are situated close to the coasts, and are generally above water, so that there is nothing to prevent a ship from running through the channel which may be most convenient. If wishing to traverse the islands without calling at any of them, the channel between Palma and Ferro, or that between Gomera and Tenerife, is recommended, being not so subject to calms as the passages between the other islands.

The currents of air, divided by the high land of some of the islands, reunite often only at a considerable distance to the southward, and then form a regular wind; thus leaving, in the immediate vicinity of the islands, districts of calm or short and sudden breezes, which are often interrupted by violent and dangerous gusts of wind. There is also a short sea occasioned by these calms, which is at times extremely inconvenient and disagreeable.

When coming from the southward unless the wind is from the south-eastward, it is not advisable to attempt to tack through the channels between the islands, as great difficulty will be experienced from the violence of the wind and the currents which almost always run strongly to the southward. It is considered better, should you wish to gain a northern anchorage, to run to the westward, and then, with the regular wind from N.E. to N.W., to steer at convenience, until you are in such a position as to reach your destination; by so doing the anchorage will be reached more quickly, and with less fatigue.

Currents.—The southerly current which prevails in the vicinity of the Canaries, does not always run through them in that direction, being frequently affected by the wind which almost continually prevails from the North by the north-east to N.W.

The currents to the northward of the Canaries, between them and Madeira, westward of the meridian of that island, run to the S.S.W. (*true*); and eastward of it, to the S.S.E. (*true*), and occasionally to the S.E. This easterly direction is more marked as it approaches the coast of Africa, until it reaches the meridian of Lanzarote or Fuerteventura.

To the southward of the Canaries the current runs to the southward, with a tendency to the eastward more or less. Near Cape Bojador it is often E.S.E. (*true*).

To the westward of the Canaries, the current runs to the S.W., S.S.W., and South (*true*), with a force of a half to 6-10ths of a mile.

The easterly current just mentioned is supposed to be an offset from the Polar Current, but observations are wanting to determine this with accuracy. At a short distance from the African coast its direction becomes changed, and it runs to the southward following the inclination of the land.

* It may be concluded that this rock does not now exist, as Lieut. Arlett, R.N., when engaged in the survey of the Canaries, sought for it repeatedly but without success.

It has been observed by Lieut. Arlett, R.N., that in no part of the world is the barometer more susceptible of atmospheric changes than amongst the Canary Islands. A rapid rise is the sure precursor of an easterly wind, whilst the contrary as certainly indicates a change to West or S.W. The easterly wind is accompanied by foggy or hazy weather, but clears immediately on changing in the least to the northward. When it blows strongly from this quarter it is called by the fishermen a *brisa parda*. The temperature of the air is very equal: the average in December is 67°; in January, 67°; in February, 65°; May, 69°; August, 76° of Fahrenheit; and it seldom varies more than 4° or 5° during the twenty-four hours.

PALMA.—This island is the north-westernmost of the Canaries. It is remarkably high, and visible at a great distance, hence it can be run for with confidence, and is frequently so even at night. The size of the island is about 25 miles from north to south, and its form is that of a wedge, the base being to the northward. A chain of hills runs through its centre, the highest of which, named the Pico de la Cruz, is 7730 feet high, and situated near the centre of the island; near this are two other peaks, De Muchacho and De Cedro, of the respective elevations of 7690 and 7470 feet above the level of the sea. From these peaks a chain of mountains also runs to the south-westward, some parts of which are of considerable height, and appear very conspicuous when approaching the island from the westward. The chain of hills running through the island from north to south gradually decreases in elevation as it approaches its southern extremity, where it is terminated by several high hills, extinct volcanoes, which have not been in activity since 1677. On the east side of the island, near its south point, is Mount Viento, 780 feet high, which is very remarkable. Besides these hills there are many isolated peaks, which are conspicuous when sailing along the shores of the island, all of which bear evidence of being formed by volcanic action.



Palma Island, distant 3 leagues to the westward.

The coasts of Palma are in general high and safe to approach within a short distance, there being no dangers but what are situated a little off the shores, and these are usually visible. The bank of soundings extends about three-quarters of a mile off, when it is succeeded by deep water.

The chief port of Palma is that of Santa Cruz, on the east side of the island, where, as the land behind the town is high and steep, the shipping can only be discerned at a short distance. In order, therefore, to avoid getting to the southward of the road, a stranger is recommended to edge in to the northward, and run down along shore, until the town and shipping come in view. Vessels here ride in 12 to 20 fathoms, during all winds, at less than a musket-shot of the shore; for although it is exposed to the eastward, yet, if you are provided with good anchors and cables, you need be under no apprehension, the ground being clean and good, and the great height of the land, facing the road, repelling any wind, though ever so strong. There is also a port on the S.W. side of Palma, named Tazacorte*,

* The following was published in January, 1848. "Several English vessels having lately sent their boats ashore at Tazacorte without receiving the succour they required, notice is given that the orders of the Spanish government are that no communication be held, or refreshment given, at any other place than Santa Cruz on the north-east side of the island."

which is exposed to westerly winds, and chiefly frequented by fishing-boats.

The channel between Palma and Tenerife is 40 miles in breadth, and is perfectly free from danger, there being on both sides very high land, with a bold shore. Vessels from the northward, and bound to the coast of Africa, are advised to use this passage, as the breeze is usually fresher and more continued than in any other, and the calms are of less duration. It is, however, necessary to keep in mid-channel, borrowing rather towards the Palma shore, in order to avoid getting too soon under the lee of Tenerife.

HIERRO OR FERRO.—This island is the westernmost of the Canaries, and is of no importance, there being neither road nor harbour in which a vessel can obtain shelter. It is of considerable height, some parts of the central ridge of mountains being nearly 5000 feet high, so that when the weather is clear, the island may be seen far off at sea. The coast is in general high and steep-to, and bordered in places by outlying rocks, which are usually visible. In no part of the island does the bank of soundings extend a mile off.

Hierro is principally famous for having been selected in former times as the prime meridian from which the longitude was reckoned. Near its N.E. point is the village of Valverde with its church. The inhabitants of the island are very poor, and there is but little communication with the other islands. A little fresh water is procurable, but no supplies, the productions of the island being inconsiderable.

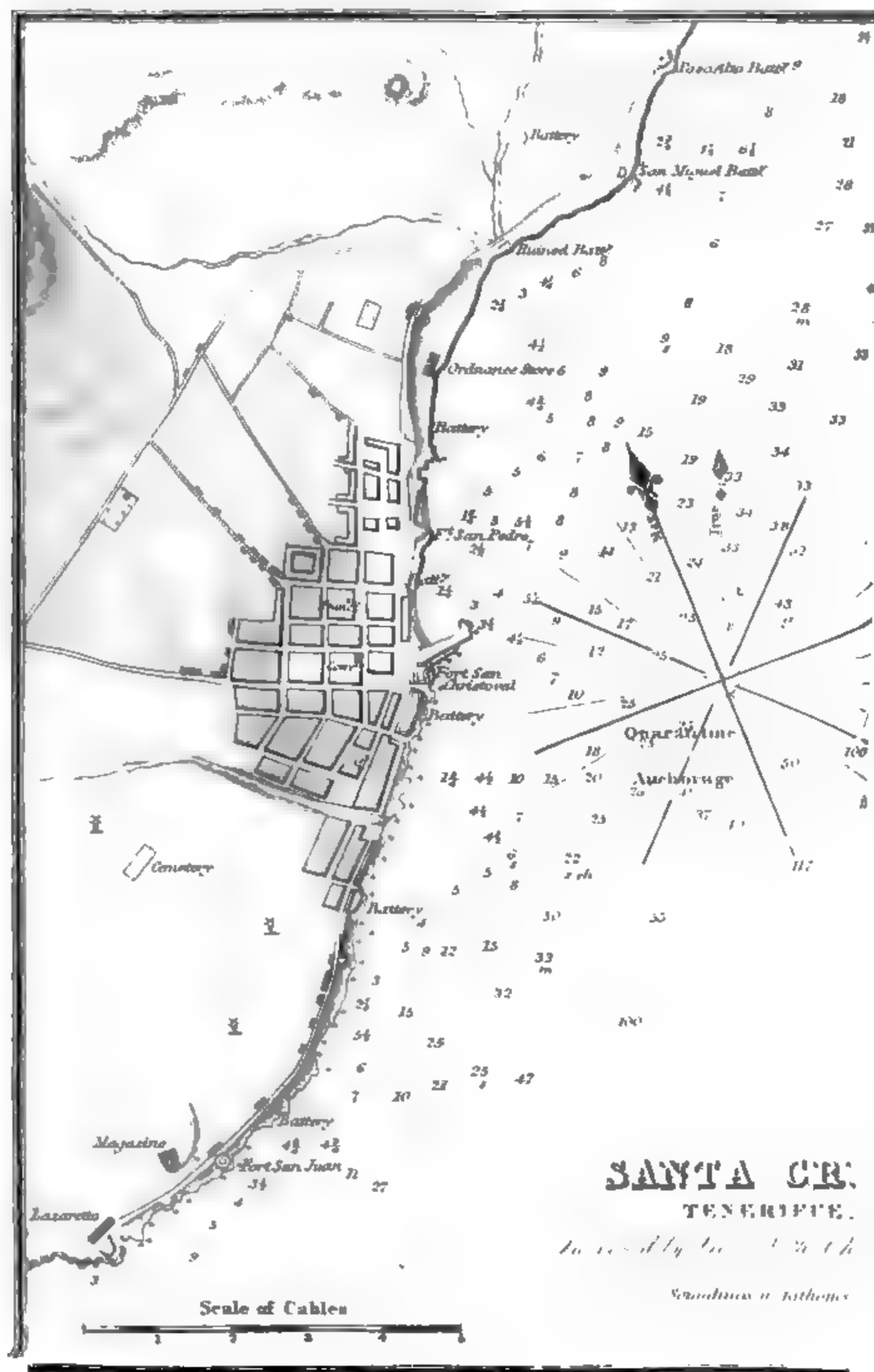
GOMERA.—This island is somewhat larger than Hierro, and lies about 14 miles W.S.W. from Tenerife. Its form is nearly circular, and its extent across is about 14 miles. The interior consists almost entirely of an elevated *plateau*; but near the centre of the island is a lofty ridge, named Alta Garraone, which is estimated to be 4400 feet high. There are besides other peaks of less elevation, one of which, Mount Salvador, is near the south coast, and is about 2500 feet above the sea level.

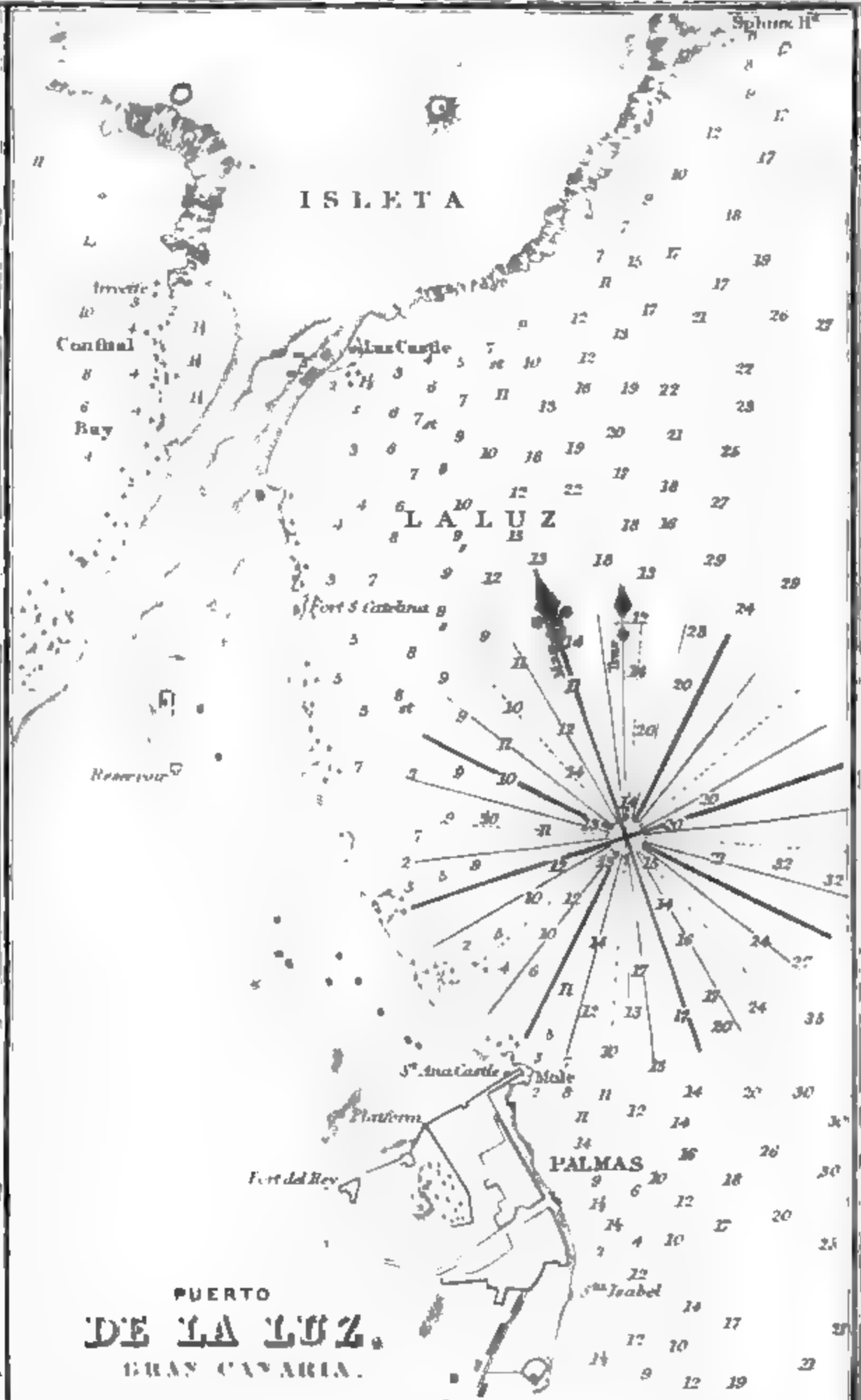
The coasts of Gomera are high and steep, and there are no dangers but what are close to their base. Between the rocky points there are occasionally little sandy bays, but they are not deep enough to afford shelter. Around the island there is a bank of soundings of 40 to 60 fathoms, which extends $1\frac{1}{2}$ to 3 miles off, and is immediately succeeded by deep water.

The place usually visited by shipping is Saint Sebastian, a village situated at the bottom of a commodious bay, on the east side of the island, where vessels may ride in from 15 to 7 fathoms, entirely land-locked from all but S.E. winds. It is essential to be securely moored here, on account of the strong eddies, particularly off the land, which frequently come in severe gales. The best situation for a vessel to lie in, is about a cable's length from the beach, having a full view along the main street of the village.

TENERIFE.—This island is one of the most important of the Canaries. It is about 45 miles in length, by 22 miles in breadth in its broadest part, which is at its western extremity. Through its centre is a ridge of very elevated land, descending rapidly on either side, the highest part of which, situated near the celebrated Peak, is estimated to be 9400 feet high, and is named Los Azulejos. This central ridge decreases gradually in height towards the north-east extremity of the island, where the mountains are under 3000 feet in height. Here on the south coast is situated the town of Santa Cruz, the principal port of the island.

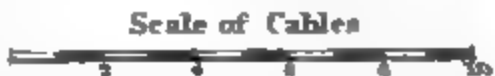
In nearly the centre of the island, or rather towards the western side, is situated the Peak, which is better known to the inhabitants by the appellation of the Pico De Teyde. It is 12,180 feet high, according to the determination of Captain Vidal, R.N., 1838, and when first seen at a great distance *off has the appearance of a mist or cloud over the horizon*; it is, generally



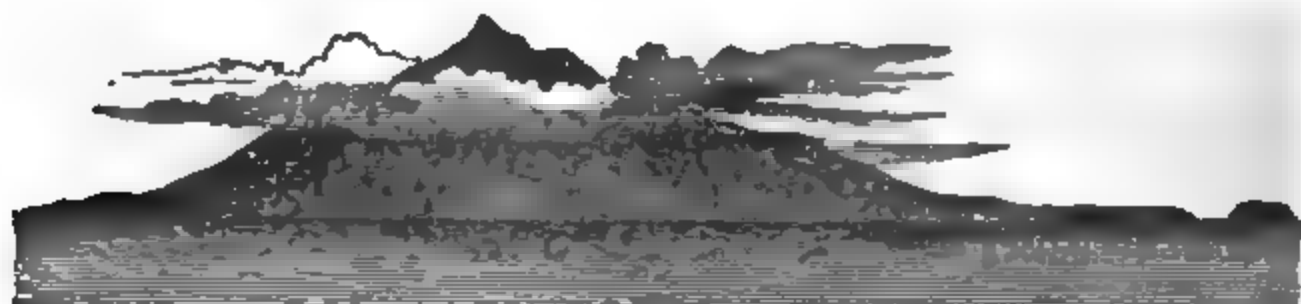


By J. H. Muller R.N.

reduced to the datum



speaking, overcapped with clouds, although when the weather is clear it can be distinctly seen upwards of 100 miles off. The islanders say it is visible 160 miles, but this appears doubtful, and almost impossible; for although its height might extend beyond the sensible horizon, the atmospheric medium of the intervening distance, would totally envelope it, and preclude the possibility of its being seen. The following view will give an idea of its appearance.



Peak of Tenerife, E. 6° S. 67 miles, Palma Island bearing N. 13° W. (true.)

Captain Beechy, R.N., visited Tenerife in June, 1825, and writes—"From our anchorage at Santa Cruz we had been daily tantalised with a glimpse only of the very summit of the Peak, peeping over a nearer range of mountains, and the hazy state of the weather on the day of our departure made us fearful we should pass on without beholding any more of it; but towards sunset, when we had reached some miles from the coast, we were most agreeably disappointed by a fair view of this gigantic cone. The sun set behind it; and as his beams withdrew, the mountain was thrown forward, until it appeared not half its real distance. Then followed a succession of tints, from the glowing colours of a tropical sky, to the sombre purple of the deepest valleys; varying in intensity with every intermediate range, until a landscape was produced, which for beauty of outline, and brilliancy of colour is rarely surpassed; and we acknowledged ourselves amply repaid for our days of suspense. Night soon closed upon the view; and, directing our compass to a well-known headland, we took a last look at the island, which was the only one of the Canary group we had seen: not on account of our distance from them, but owing to that mass of clouds which 'navigators behold incessantly piled over this archipelago.'"

The coasts of Tenerife are in general high and steep, with no dangers but what are close-to, or a short distance from their base. At a little off the land of Point Anaga, the north-east extremity of the island, and on the north side, are two high black rocks, named the Anaga Rocks, having a clear channel of 13 to 14 fathoms between them. There is also an isolated rock off the village Garachico, near Buenavista Point, which is directly opposite the houses. The bank of soundings seldom extends more than $1\frac{1}{4}$ mile off, and is immediately succeeded by deep water.

Santa Cruz.—The principal port of Tenerife is Santa Cruz, situated on the south-east side of the island, at about 9 miles from Point Anaga. The capital of the island is Laguna, built on the central ridge of hills traversing the island; it is 5 miles from Santa Cruz, and a constant communication is kept up with that port, where is the residence of the civil and military authorities and of the governor of the islands.

There is but little at Santa Cruz to interest a stranger. The houses are of dazzling whiteness, and are not well built, and there are no public buildings with any pretensions to elegance. Wood and water can be procured, and supplies of provisions may also be obtained. The best road for shipping is

between the middle of the town and a fort or castle, about a mile to the northward of it; here ships anchor in 6 or 8 fathoms, at a cable's length from the shore, or, in 25 or 30 fathoms, at half a mile distant. Care must be observed, in going in, not to bring any part of the town to the northward of West, lest calms should be caused by the land under the Peak; and should you be driven ashore, anchors and cables are of no use, as you will have no ground on the opposite side of the ship, with 200 fathoms. When a ship lies any time in the road, it is necessary to buoy her cables, otherwise the ground, being in some places foul, may chafe and spoil them. Here vessels, if moored with good cables and anchors, may ride securely in all winds, although the bay is exposed and open to those which blow from the N.E., East, and S.E.; but it is said that not above once in the space of 4 or 5 years do they blow so hard as to cause any considerable damage.*

Mr Bartlett, the English Consul at Santa Cruz, 1844, gives the following instructions for the anchorage:—"A vessel from the northward should endeavour to make Point Anaga, the north-east extremity of Tenerife, which is very lofty and easily known by two large high rocks lying close to it. Care should be taken not to get to leeward, the prevalent winds being between N.N.E. and E.N.E. After passing Point Antequerra $1\frac{1}{2}$ mile to the southward of Anaga there is a small shoal not far from the land between these points, named La Mancha, the town of Santa Cruz will be visible. While running for the anchorage keep both leads going, and bring up to the northward of the mole-head; or bring the clock front of the square church tower, that has a Cupola (San Francisco), to bear West (*true*) W.N.W by compass, and anchor with this mark on or to the northward of it.

Ships anchor in 30 fathoms or less. Give a large scope of chain cable, when the northernmost fort (Paso Alto) bears N.N.E., and the tower of San Francisco, as before stated; the depth of water will be about 25 fathoms. The shore may be approached without risk, the water being deep and there being no dangers but what are apparent. The anchorage to the southward of the mole is reserved for vessels in quarantine."

Lieut. Church, R.N., says of Santa Cruz, "Whilst surveying the Canary Islands in the *Ætna*, we had, of course, considerable experience of Santa Cruz, and had no reason to consider it an unsafe anchorage. During the very many times that the *Ætna* was there, in only one instance did we experience a gale from the south-eastward. Most of the shipping slipped at the commencement and got into the offing; but we remained at our anchors, and rode it out well. Although a heavy sea tumbled in, there was much less strain on the cables than might have been expected, arising as it appeared to us from an offset, which, together with there being a great up-hill drag for the anchor, diminishes the chance of driving.

The church tower with the cupola (San Francisco) open a little to the right of the mole-head, is considered the usual anchorage, and vessels congregate here in order to be near the landing-place. But, in a man-of-war, I would (especially if there are many vessels here) anchor considerably to the north-

* The following is the order for the regulation of quarantine, issued November 20th, 1832, which may still be in force:—"On the appearance of a British ship, a boat with a pilot, and carrying the Royal Spanish flag, will leave the mole, and point out the quarantine anchorage. If, from circumstances, it should be necessary to anchor, before communication can be had with the boat, the line of quarantine anchorage is S.E. and N.W., by compass, with the mole-head (nothing to the north of it); distance from 2 to 6 cables' lengths from the land; the depth of water, 10 to 20 fathoms, rocky. Anchorage to the north of the line stated, is for vessels admitted to free pratique. No ship is to lower boats, or communicate in any manner whatever, until visited by the health boat, and permission obtained. Ships bound to any port in any of the Canary Islands, from infected countries, must come to this bay, which is exclusively appointed for the observance of quarantine."

eastward or windward of this resort, the bank of soundings being wider, and to avoid having merchant-ships in the hawse; indeed, I see no reason why ships should not anchor nearly as far north as the Paso Alto fort, the most northern battery, in case the roads are crowded with shipping.*

I have noticed that ships coming from the north-eastward to Santa Cruz, run down at too great a distance from the land, and do not haul in until they get nearly abreast the town. They get a cast or two of the lead with no bottom, and immediately they get into soundings, the anchor is let go in a hurry, the bank being narrow and the ship's head in-shore, there being little time for consideration.

Instead of this method of proceeding, I think it would be advisable, on making the north-east end of Tenerife, Punta de Anaga, to haul in upon the bank of soundings immediately on passing Punta de Antiquerra, as from this point to Santa Cruz the bank extends as far out from the land as at the town, and the anchorage is just as good and as safe anywhere when abreast of the barrancos. I would get into the depth nearly that I wished to anchor in, and then run down with the light wind parallel to the shore. Besides having time to anchor leisurely, there is the advantage of being enabled, in case it falls calm, to let go an anchor under foot wherever you may be.

Should it fall calm, while the ship is outside soundings, she may be taken away to leeward by the southerly set, which once caused us twenty-four hours trouble to get back again. From experience, we latterly adopted the system I have mentioned."

Orotava.—This port is on the north-west side of the island, at about 25 miles from Point Anaga. It is exposed to N.W. winds, which cause a heavy swell, but these, luckily, seldom occur, and in general give sufficient warning to afford time for a vessel to get away. The anchorage is in 40 and 50 fathoms, at about $1\frac{1}{2}$ mile from shore, with the Peak bearing S.W. Considerable damage was done to Orotava and its vicinity, by a dreadful hurricane which occurred in November, 1826. At 2 miles inland from the port is the town, situated in an amphitheatre of hills.

At 11 miles to the westward of Orotava is the village of Garachico, having before it a rocky islet, which affords protection to small vessels. All this part of the coast is exposed to winds from the northward.

Directions to be observed by British Vessels frequenting the Island of Tenerife.—A Bill of Health is an indispensable document for a vessel's admission here, from whatever port she may arrive. The quarantine-laws are very rigorously enforced, and the want of a Bill of Health subjects vessels, even from England direct, to a quarantine, which is never removed without the ceremony of repeated health-visits, and payment of heavy fees. Great care must be taken not to get to leeward of the island, as it is a tedious and difficult matter to get up again, the usual and prevalent winds being between N.N.E. and E.N.E. Point Anaga should be made, which is the N.E. point of the island; it is very high, and easily known by two large high rocks, close to it, which appear like ships, and may be seen 7 or 8 leagues off. You must then run down till you come within 2 or 3 leagues; and, if bound to Port Orotava, must

* Mr Bartlett says that "there can be no doubt of the goodness of the anchorage to the north, near Paso Alto, but the objection for transports and merchant-ships is, that the masters will anchor to the north of the other vessels to be near the landing-place, and as the line of hills trends to the westward, and the land from the beach thereabouts is high, the land breeze is not felt (unless strong), and large ships with heavy anchors and few men will often find it difficult to get away, as before the anchors can be weighed, and the sails set, they will drift among the small vessels. Hence the great superiority of the anchorage, I have pointed out, as the land breeze is more felt and precautions being taken that the ships' head swings to seaward, she is immediately clear of all impediment, and the anchor may be secured leisurely."

steer down along the north shore (which is very bold, and quite free from danger), keeping 2 or 3 leagues distant; and after running 8 or 9 leagues, if you should not see the Peak, which is often clouded, you will see a large white town (Orotava) on the side of the high land, about a league inland, with two small regular-shaped green hills under it, between which you must steer directly in, and, by so doing, will raise, as it were, another town out to sea: this is Port Orotava, for which you must steer directly in, until you meet the pratique-boat, which will be about 2 or 3 miles off; it is a low boat and comes with the Spanish colours set upon a staff;—at any rate, you must not be afraid of running in for the land, as it is very deceiving, and you will be 4 or 5 leagues off, when you do not think yourself so many miles; in that case you will not soon get a boat, for they do not come off until you approach very near. The boat, when she comes, brings a pilot and leaves him on board. You must also bring with you your register, pass, clearances, &c.; and you must take care not to deliver either letters, or other papers (except your Bill of Health) to any person who may ask for them, without some document either from your consignee or the consul.

In running down, you must prepare your anchors and cables; it is customary to bend your small bower cable, with which you will bring up, with only one turn round the windlass, in order that it may run out quick, as the spot where you ride (about half a league off, and to the westward of the town) is very small; and if there be many vessels there, it is necessary that your anchor go very quick, as you bring up in from 30 to 40 fathoms of water; but there is little or no tide, and she will bring up easily. You must give her the whole cable round the windlass; your buoy-ropes should, therefore, be 45 fathoms long. During the summer months, from April to October, all vessels are moored in an inner harbour, or creek, with iron chains, kept by merchants, for that purpose. Vessels that fall to leeward very often lose much time by mistaking Garachico for Port Orotava, from whence it is distant $4\frac{1}{2}$ leagues. There is some similarity in the appearance of these places, Garachico having also above it a white town, inland, named Icod; but besides, by their situation, Garachico being much nearer Point Teno, the west point of the island, these places are very easily distinguished by the above-mentioned two equally-formed round green hills. Point Anaga lies in latitude $28^{\circ} 34'$ N., and the Salvages lie true North from the point, distant 28 leagues.

The Grand Salvage is very high, and may be seen 10 or 12 leagues off. Your direct course from the Grand Salvage to Port Orotava is S.W. (*by compass*), and distance 38 leagues; but particular care must be taken not to fall to leeward. The Peak of Tenerife may sometimes be seen 40 leagues off, but it is very often hidden by clouds. Should it happen in the winter that you arrive off Port Orotava, during a N.W. or N.N.W. gale, which rarely occurs, but throws in a very heavy sea upon the coast, and would prevent a boat going off to you, it is best to bear away for Santa Cruz, on the S.E. side of the island, after doubling Point Anaga.

Santa Cruz is the preferable place to touch at, for vessels in want of water and refreshments. All vessels, on approaching these ports, ought to hoist their colours, and show their consignee's signal; or, when unconsigned, and only visiting the island, a union jack at the fore, and a white flag with a pendant over it at the main, in order that boats may be early sent off to them by their consignees, or by the consul."—*Advices from Tenerife, dated the 11th November, 1816.*

GRAN CANARIA, is about 24 miles in extent, and is the most important island in the Canaries group, as it offers more resources, and better shelter

than any island in the archipelago. In the interior it is exceedingly lofty, the range of mountains named Los Pexos, being 6400 feet high, so that the island can be seen a considerable distance in fine weather. Most of the mountains are wooded, and from them flow streams of water, which in the winter time become torrents. It has been observed that Gran Canaria affords more anchorage than any of the other islands, the bank of soundings almost everywhere extending farther out. During the summer, when there is a constant N.E. wind, the high land obstructing its course, occasions calms to prevail off the south-west end of the island to the distance of 8 or 9 miles from the land, where the divided currents again unite. The same cause, however, occasions a westerly current close in shore, which the island vessels take advantage of.

The coasts of Gran Canaria are high and steep, and there being scarcely any outlying dangers, may be approached in general with safety. Off the eastern side of the island are a few rocky islets and reefs, mostly visible, and close to the shore. In the open bays a frequent use of the lead is sufficient to avoid danger.

In the north-east part of the island is the Isleta, a peninsula of about 8 miles in circumference, which is connected to the island by a narrow isthmus $2\frac{1}{2}$ miles in length, each side of which forms an extensive bay. That on the east side is named Puerto de Luz, and is a spacious sandy bay, with good anchorage for vessels of all burthens, within half a mile to $1\frac{1}{2}$ mile N.E., from the town, but the latter distance is to be preferred, as the ground is better. There are several steep rocks at the entrance, on the N.E., which protect the shipping, and you may lie secure from all winds, with the exception of that from the S.E., to which the bay is quite exposed; however, it but seldom blows sufficiently fresh from that quarter to endanger the shipping. At the bottom of the bay is the town of Palmas, the capital of the island, which is a large handsome town, containing about 1800 inhabitants. There is a cathedral, hospital, and college, with convents for monks and nuns of all orders. The city is well supplied with water, having fountains in all the principal streets and squares; the market is also well furnished. There is a mole for shipping, and other conveniences for those visiting the port. Vessels, with cargoes for Palmas, often anchor, in fine weather, within half a mile of the town, but it cannot be considered a good roadstead.

The bay on the east side of the Isleta, named Confital, is open to the N.W., and is only used by small vessels. Along the coast are a number of rocks, through which are passages available for the small coasting vessels which occasionally obtain shelter behind the rocky heads. Near Point Confital, is a patch of 9 fathoms, upon which the sea sometimes breaks; it lies with a ruined fort in one with the north bastion of the citadel at Palmas. When the wind blows strongly from the S.E., the fishermen quit Palmas Bay, and run into Confital Bay, where they can anchor in 17 to 25 fathoms, sand, and in smooth water.

At about 12 miles to the northward of Port Palmas is Gando Bay, in which there are soundings of 14 to 20 fathoms. In the north part of the bay is a castle, before which small vessels occasionally anchor. In running into this bay, Gando Point, its north point, must not be too closely approached, there being a rock awash a short distance off it. This bay is quite exposed to the eastward; but it is said to afford water and provisions, for which purpose it is sometimes visited.

FUERTEVENTURA.—This is a long narrow island, lying to the eastward of Gran Canaria, nearly 45 miles. Its length is about 52 miles, and its breadth from 6 to 15 miles. Like the islands already described it is very lofty, but the mountains do not rise to so great an altitude as those in Gran Canaria.

the highest land, named the Asses Ears, at the south end of the island, being not more than 2770 feet above the sea level. It is very barren, and affords but few supplies either of provisions or water.

When seen from a distance, Fuerteventura has somewhat the appearance of two islands, in consequence of the low peninsula at its southern end. The coasts are in general high and steep, rendering a landing difficult; and there are no safe anchoring-places, the whole being exposed. A bank of soundings surrounds the island to the distance, on the west side, of about 5 miles, which is immediately succeeded by deep water.



Asses Ears.

Matas Blancas.

South-east extremity of Fuerteventura.

The south-west end of Fuerteventura, named Jandia, is low and rocky, and has a rocky reef extending from it nearly a mile; it must, consequently, be approached with caution.

The principal port of the island is Cabras, on its eastern coast. It is an insignificant place, containing, in 1836, 1000 inhabitants. The anchorage is indifferent, and the landing-place, which is a beach of shingles, still worse; nevertheless, the whole exports of the island are shipped from hence. These exports consist of barilla, orchilla, corn, camels, honey, and goat-skins.

Lieut. Artlett, R.N., says,—“ Although the general feature of Fuerteventura is extreme barrenness, still there are many spots of great fertility; the most conspicuous of these is the valley of Oliva, towards the north end of the island, where there is a village of the same name, the residence of the Lieutenant-Governor, who is a lineal descendant of John de Bethancourt, and possesses a very considerable portion of the island. The valley of Oliva is about 15 miles long, and generally from 2 to 3 wide; the only two streams of pure water in the island have their rise in the mountain of Atalaya (or Watch Tower); they are husbanded with great care, and irrigate the whole of the valley. A paved road, about ten miles from Cabras, towards Betancuria, or La Villa, is the only one on the island; the others are mere tracts following the direction of the valley, where the ground is less encumbered with stones, and softer to the camel's feet. Although double the size of Lanarote, Fuerteventura has not a greater population, it being from 17,000 to 18,000, scattered in small villages over every part of the island.

The interior formation of Fuerteventura is singular: to the north is a group of extinct volcanoes—some of them, as Monte Mudo, rise to the height of 2160 feet—and which, to the southward of Port Cabras, branch off east and west to the sea, follow the direction of the coast on each side, for about 30 miles, and then again unite, encircling an extensive and arid plain; several villages are scattered about, and, from the summit of the hills, the course of some brackish streams may be traced by the verdure they impart. There are also some date palms, the only trees, except the fig, on the island.

From the southern point of junction of the mountains, one of which, Monte Chilegua, on the western coast, reaches the height of 2160 feet, a narrow sandy isthmus, about 5 miles in length and $2\frac{1}{2}$ in breadth, projects, connecting it with the south extremity of the island, which is a peninsula,

occupied by the mountain of Jandia. This mountain offers, perhaps, as remarkable features as any in the world; it presents its precipitous face to the north-west, rising 2820 feet. Spurs, or buttresses, diverge from its centre to the north-east, to the east, and to the south-east, by any of which it may be ascended. I had occasion to take my theodolite to the top of it, and, not aware of its peculiarity, on reaching its summit, was running forward, when I perceived that the narrow ridge on which I stood overhung a frightful precipice 2820 feet in depth."

Off the northern extremity of the island is Lobos, or Seal Island, which is about $1\frac{1}{4}$ mile in circumference, uninhabited, and destitute of water. Near it is a good road for shipping; the mark for which is, to bring the east point of the island to bear nearly N.E. by N., and anchor half-way between it and Fuerteventura, or rather nearer to the latter. Although this road seems to be open and exposed, yet it is very safe with the trade-wind, for the water is smooth, and the ground everywhere clean, being a fine sandy bottom. Directly ashore from the road, on Fuerteventura, is a well of good water, of easy access.

The channel between Fuerteventura and Lanzarote, named *La Bocayna*, is 4 to 6 miles wide, and the depth from 15 to 20 fathoms. Vessels sailing through here, from the eastward, with the trade-wind, will lose the breeze when under the lee of Lanzarote, and find baffling winds at S.W.; you must therefore fly to the Lobos side, where you will soon get a steady northerly wind to carry you through. Do not approach too near Lobos, as the ground here is foul and rocky, which causes a heavy swell and breakers of incredible height; the noise they make is sometimes heard 5 or 6 leagues off.

LANZAROTE.—This island runs in a N.E. and S.W. direction about 31 miles, with a breadth varying from 5 to 10 miles; it is mountainous, of volcanic origin, and has many extinct volcanoes. Its centre rises about 2000 feet above the sea level. From its northern extremity, Point Farion, a barrier of precipitous cliffs, rising to the height of 1500 feet, runs in the direction of S.W., 7 miles, and terminates in an extensive sandy plain, where in 1825, a volcanic eruption took place, and two considerable hills were thrown up, which in 1835 were still burning: a stream of lava, from 200 to 300 feet in width, found its way to the sea in the bay. Near Point Farion is Monte Carona, 1940 feet high, which is an extinct volcano; and 5 miles more to the south-west, is Monte Famara, situated on the west coast, which is 2244 feet high.

The highest land in the island is Montana Blanca, 1959 feet above the sea, which is situated nearly in the centre, and cultivated to the summit. The wine produced in the island is very superior to that of the other islands. The grapes are superior in flavour; the soil selected for their cultivation is decomposed scorïæ.

The town of San Miguel de Tegüise, the capital of the island, is situated near its centre, at about 4 miles to the southward of Monte Famara; it is not of great extent, and can only be seen from the westward. Near it is an isolated peak, having on its summit the castle of Santa Barbara.

The western and southern portions of the island are mainly occupied with isolated mountains, which become a range of considerable elevation as they run to the southward. Near Point Papagayo is Monte de la Hacha Grande, which is estimated to be 1860 feet high; and near Point Pechiguera, the south-west extremity of the island, is Monte Roja, 680 feet high, which from its isolation appears from some points of view like an island.

The western coast of Lanzarote from Point Penedo to Point Pechiguera, is precipitous in the extreme, with the exception of one little bay, named

Januvio, 5 miles from the last mentioned point, where was once a harbour for small vessels, but which is now converted into a salt-water lake by an eruption which took place in 1765.

The eastern shore of Lanzarote is not so steep as the western; and it is on this side are situated the principal ports of the island. At about half-way down is the port of Naos, a small but secure harbour, formed by several rocky islets. It has two entrances, each of which is defended by forts; the northern entrance has a depth of 12, and the eastern of $17\frac{1}{2}$ feet at low water, with a rise of tide of 9 feet. Vessels drawing under 18 feet, may enter this harbour at high water, spring tides, and lie securely in all winds, although in sailing along the coast, the shipping appear to be at anchor in an open road, the port being formed of a ridge of rocks, seen at only a short distance, as they are mostly under water; these break off the swell of the sea, so that the inside is as smooth as a mill-pond. It is to this harbour that nearly all the island-vessels resort during the winter.

Immediately to the southward of Port Naos is the town of Arrecife. Many of the houses are large, and the streets spacious; its present (1835) population is 2500, the total population of the island being 17,500. The greater part of the inhabitants of Arrecife are engaged in the fishery on the opposite coast of Africa, which gives employment to between 400 and 500 men from this island alone, about 250 from Fuerteventura, and proportionally from the other islands. Lieut. Artlett thinks that Spain, on an emergency could procure 2000 able young seamen from these islands without very much affecting the fishery.

At the north-eastern extremity of Lanzarote are two remarkable rocks composed of black vitrified matter, which, in shape, resemble the Needles off the Isle of Wight, England.

El Rio.—This is the strait separating the Island of Graciosa from the northern extremity of Lanzarote. It is in most parts rather more than a mile wide, and is the most capacious and only safe port for large ships in the Canaries; the extreme difficulty of communication with Lanzarote presents, however, an insuperable objection to its being resorted to as a harbour for trade. The basaltic cliffs here rise almost perpendicularly to the height of 1500 feet, and can only be climbed by a narrow path which winds along the face of the precipice; half way up the cliff is the only spring of fresh water in the island, but rendered useless from its situation, except to a few goatherds. Through this channel ships of any size may pass in mid-channel, and find a depth of 7 to $4\frac{1}{2}$ fathoms.

When from the eastward, and having entered the Rio Channel, should you require a smooth place to lie in while the trade wind blows, you should run a good way in, and double a shallow point on the starboard hand, which must not be approached to a less depth than 4 fathoms, and when beyond it, you may anchor in any depth you please. The water, however, is not so smooth as at Port Naos, especially if the trade-wind happens to blow hard from the East, but it does not often come from that quarter, as those which are most prevalent blow from North and N.N.E. To moor here, care must be taken to have a good anchor, and a long scope towards Lanzarote, for, with East and S.E. winds, heavy squalls come from the high land of that island. In winter, the wind sometimes shifts to the S.W.; in that case, it is necessary to weigh, and run to the eastward, round the shallow point before noticed, until you find shelter.

GRACIOSA, &c.—This island is to the northward of Lanzarote, being separated from it by the El Rio Channel. It is about $4\frac{1}{2}$ miles in extent, rocky, and apparently destitute of water. The highest part of the island is

about its centre, where it is 873 feet above the sea. The shores are bordered by rocks. There are no inhabitants on it, and it is used principally as a pasturage.

On the west side of Graciosa is the Montana Clara, a rocky island about a mile in extent. A little to the northward of it is a rock on which the sea breaks; it is named the Infierno Rock, and appears to be composed of a mass of lava 18 or 20 feet high. From the west side of this rock a reef extends a short distance, and there is apparently a narrow passage between it and Clara.

The Island Allegranza, to the northward of Clara, is the northernmost of the Canaries. It is a small island composed of a mass of lava and cinders, the product of a volcano now extinct, which volcano rises to the height of 989 feet above the sea. The edge of the crater is well defined, and two-thirds of a mile across; its bottom is cultivated for barilla. The western cliffs are precipitous, and 700 feet high. Forty persons reside on the island (1835), who are principally employed in collecting orchilla. The only landing-place is on the south side, where a cavern runs for about 500 paces slanting from the sea, and terminates in a little sandy bay, open above; at the entrance the rocks form a natural jetty. The village is situated immediately above, and abreast is the only anchorage, half a mile from the shore.

The islands of Graciosa, Clara, and Allegranza, usually termed the Little Canaries, are connected to Lanzarote by a bank of soundings on which there are for the most part 40 fathoms water.

At about 7 miles to the north-eastward of Lanzarote is the Roquete del Este, or East Rock, a craggy isolated rock, having soundings of 10 to 40 fathoms, at a short distance off. Between it and Lanzarote are 60 to 70 fathoms, and 2 miles East of it is no bottom at a depth of 100 fathoms.

DIRECTIONS.—If a ship, lying at Palma, is desirous of going to Lanzarote, and will not wait for a fair wind (which indeed seldom blows there, especially in the summer season), let her stand over to the N.W. side of Tenerife, and beat up along shore, until she weathers Point Anaga; thence, with the wind that generally prevails in these parts, she will be able to weather Gran Canaria, and fetch the point of Jandia, Fuertaventura, or perhaps Morro Jable (the southern point), whence it is easy to beat up to Pozonero, along the east side of the island, because the sea there is always smooth. It is not quite so easy to beat up from Pozonero to the Isle of Lobos, yet it may be done, without much difficulty, when the weather is moderate; if the wind should happen to blow hard, she may stop in the bay of Las Playas, until it proves more favourable.

From the Isle of Lobos, she will find no difficulty in beating up to Port Naos, in Lanzarote. It is not advisable for those who are not perfectly well acquainted with that harbour to attempt to conduct a ship in, because the entrances are very narrow.

It is common for ships, which come loaded from Europe to Santa Cruz, Tenerife, &c., to have part of their cargoes to unload at Port Orotava. These ships, when the trade-wind blows hard, will sometimes find it impracticable to weather Point Anaga: when this is the case, they should bear away to the leeward point of the island, and keep near the shore, where, if they do not meet with a southerly wind, they will be carried by the current, in the space of 24 hours, from the S.W. point of the island to Point Teno, whence they may easily beat up to Port Orotava; for, when the wind blows strong at Point Anaga, it will be moderate weather all the way, until within 2 or 3 leagues of Point Anaga. But a ship should not bear away, as above directed, unless when the trade-wind blows so fresh that she cannot

weather Point Anaga; because, in moderate weather, there is little or no wind stirring on the coast between Teno and Port Orotava.

The coast of Africa, east of the Canaries, is level, and rendered dangerous, and almost inaccessible, by a heavy surf which breaks on it continually. The Canarians, in the sea between this coast and the islands, employ a number of barks in fishing for bream and cod. The passage is about 20 leagues wide, and clear from any known danger.

Winds and Calms peculiar to the Canaries.—In the vicinity of the islands, brisk trades are, generally speaking, most prevalent from N.E. to North, throughout the year. They sometimes give place to N.W. and S.W. breezes, the latter of which not unfrequently blow for a continuance of ten days. And on account of the enormous height of the mountains, when near the land, you are subject to strong gusts and eddy winds blowing in an opposite direction to that outside, which the navigator ought to avail himself of, when beating to windward. Vessels sailing through, most commonly carry the breeze a few leagues to the southward of the islands, more or less, according to the strength and direction of the wind, which, if far north, will take you more to the southward, and the contrary, if to the eastward.

On approaching the calms, you will find a heavy, disagreeable, bubbling swell; the sea breaks, and is very irregular, consequently producing a distressing motion to the ship, which renders it necessary to take advantage of every breath of wind to get to the southward. These calms are occasioned by the intervening high land of the Canaries obstructing the regular course of the trades, and extend from 10 to 30 leagues to the leeward, in proportion to the power of the breeze outside. And it may farther be observed, when the trades are light, the calms are more extensive; at which time, however, light S.W. breezes prevail; and, on the contrary, when they are strong, the calms are very circumscribed, but not the slightest air within for some days.

Between the Canaries and the Cape Verde Islands, a current runs to the S.W. at the rate of half a knot, increasing as you approach the islands. In about the parallel of 14° and 16° N., the trades begin to lose their strength, veering round from the northward to the N.W., and from thence to the westward, and S.W., as you draw in with the coast of Africa, in the latitude of 7° and 10° N.

SARGASSO SEA, &c.

Between the parallels of latitude of 12° and 35° is a district, which is commonly studded over like an inundated meadow, with bushes of a marine plant, named the *fucus natans*, in some places very abundant, and in others more dispersed. Hence this part of the ocean has been denominated the Mar de Sargasso, or Grassy Sea. If we could imagine the surface of a wide extended moor covered with water, the furze and heath bushes would appear something like the clusters of fucus scattered over the thickest part of this sea. It has thus been described by a modern writer:—"The sea, within *the vicinity of these islands*, is particularly remarkable for the immense float-

ing beds of wrack or sea weeds, dispersed over its surface, and has given rise to various opinions as to its place of growth, and whence it is ultimately deposited. It, however, proves decidedly to be an American plant, a species of the *algæ*, named the *fucus natans*, produced from the rocks and shore contiguous to the Florida Gulf, from whence it becomes detached on arriving at a state of maturity, and carried off by that well known stream to the African coast, returning from thence again to the westward, in the course of the trades.

It has been a subject of surprise to many naturalists, that this plant should never be found in its withering state; but like every other species of the vegetable world, it proceeds with equal regularity through the process—growth, maturity, and decay. It certainly continues vegetating for a considerable period in its detached state, and is supported by the air globules which cause its buoyancy; but immediately the symptoms of decay manifest themselves, the buoyant principle is lost by the sudden discharge of the globules, and the plant sinks, which accounts for its not been frequently seen in its last stage.” Notwithstanding this opinion, many others affirm that the weed grows on the rocks, at the bottom of the ocean, in the Sargasso Sea.

PORGAS BANK.—Between the Cape Verde Islands and Cape Verde has been assigned an immense bank of soundings, between the latitudes of 19° and 20° , extending as far as 18° N. latitude, named the Porgas Bank, upon which is said to be “a constant undulatory motion and rippling, causing a noise similar to that of breakers, arising from the action of the waters on the bank underneath.” The existence of this bank is, however, much questioned, as many ships have passed over the position assigned to it without getting soundings.*

CAPE VERDE ISLANDS.

These islands are ten in number, and lie about 100 leagues on a parallel to the westward of Cape Verde, the nearest point of Africa, from whence they derive their name. They were first discovered by the Portuguese, who named them as follows:—Ilha de Sal or Salt Island, Bonavista, Mayo, St. Jago, Fogo, Brava, St. Nicholas, St. Lucea, St. Vincent, and St. Antonio; besides these there are several smaller islets. They are of volcanic formation, and boast a climate and vegetation approaching nearly to that of the temperate regions. The largest and most important island is that of St. Jago, the chief town of which is the seat of government.

The best course for vessels bound to St. Jago, from the Canaries, is to stand to the southward, to about 25 to 30 leagues to the eastward of Bonavista; and from the latitude of 16° , which is that of the middle of the island, they should sail westward to get sight of it. It has also been observed,

* Mr Aylen, late Master of H.M. Yacht Victoria and Albert, is reported to have obtained soundings on it, in February, 1851, in lat. $17^{\circ} 0' N.$, and long. $20^{\circ} 8' 15'' W.$ The bottom consisted of shells and sand, or small pieces of coral; but the depth is not stated.

“though it may seem natural enough not to suspect any errors of consequence in your reckoning, in so short a passage, as from the Canaries to the isles of Cape Verde, yet there are instances of such, as well to easting as to westing. It is with respect to errors in our westings that I advise all vessels to keep 30 leagues to the windward of Bonavista, before they stand in to make the land; lest, in keeping a direct course for that island, they should pass between the Island of Nicholas and the Island of Sal; and, finding themselves to the westward of Bonvista, when they reckon themselves to the eastward of it, they should miss of their refreshments at the Isle of St. Jago,—an accident which has happened to several vessels.

The making of these islands is often difficult, occasioned by the fogs which hang frequently around them. For this reason, those who come from the northward, ought to steer their vessels in this tract with all possible precaution.

The most convenient course for vessels which continue their voyage from the Canaries, without touching at the islands of Cape Verde or Goeree, is to steer, after they lose sight of the Canaries, so as to pass about 45 leagues west of Cape Blanco (or near the meridian of 26°); from this position they will make good their course due south, as far as 12° N., and afterwards S.E. by S., till they meet with those variable winds which succeed to the trade-winds. By this they will keep the mid-channel between the islands and Cape Verde, and coast along the bank below that cape a sufficient distance, even though they should make an error in their reckoning of 15 to 20 leagues eastward.”

All the channels between the islands are safe, there being no danger but what are in the immediate vicinity of the shores. When running between Bonavista and Mayo there is a dangerous reef to be avoided, named the Leton, which lies about 18 miles W.S.W. of Bonavista.

The prevailing wind among the islands is N.E., except during the winter, at which time South to S.W. winds prevail, and occasionally blow with considerable strength; these latter winds vary in direction, and seldom continue long from the westward. It has also been well ascertained that light winds from the N.E. are never so permanent, or so continuous in their direction, as to the westward of the islands. It even occasionally happens that in approaching the islands calms and variable winds are experienced, especially during the winter months.

BONAVISTA.—This island, as its name implies, presents a beautiful variegated appearance, interspersed with scattered mountains, which terminate in low points to the water. It is the most dangerous of the Cape Verde Islands, on account of its being surrounded by rocks and shoals, also that the current sets directly on it from the N.E. Off the N.E. point of the island are some dangerous reefs, extending 4 miles from the land, which are attached to three islets, named the Dutch, Braithwaite, and North Cays. Between these is sufficient depth of water for ships, in case of necessity, and anchorage under the lee of the reefs; the best situation is with Braithwaite Cay bearing N.E. by E., and Dutch Cay S. $\frac{1}{4}$ W., or you may moor half a mile from the former in 6 or 7 fathoms, with the ground tolerably good. Mount Ochello, or Ochel, in one with the North Cay, will lead on to the north point of Hartwell Reef, and the same mountain West (true), will lead to Braithwaite anchorage; but this latter must always be taken with great care.

The north side of Bonavista Island has several sunken rocks about it, particularly between Broyal Point and the N.W. Reef and Point; it will therefore be prudent to keep $2\frac{1}{4}$ or 3 miles from land.

English Road lies on the N.W. side of the island, and is a safe anchorage in

fine weather. In proceeding for it, it will be proper to give the N.W. point of the island a good berth, keeping a mile from the shore; and about 4 miles to the southward you will perceive Small Island, which forms the N.W. side of the road. It is common for vessels to haul close round Small Island, in 6 or 7 fathoms, passing between it and a 10-foot reef, by which they avoid the necessity of tacking for the anchorage: the best mark for the latter is, the town open with the N.E. end of Small Island, and the highest part of the same island bearing about N. by E. The reef usually shows itself; but should this happen not to be the case, it will be better, particularly for a stranger, to go to the southward of it altogether, and endeavour to round it at the distance of $1\frac{1}{2}$ or 2 miles from Small Island, taking care not to get into less than 6 fathoms; and observe that, after once opening the town, you do not shut it in again.

The new town is on the middle of the bay, and the second reef (*New Town Reef*) lies to the westward of it, a short distance from the beach. The *Inner Reef* lies half a league to the northward, and is also near the shore.

At about $4\frac{1}{2}$ miles S. by W. from Small Island, is Coral Point, $2\frac{1}{2}$ miles to the westward of which is Coral Reef, which must be left on the port hand when proceeding to the southward, as the channel between it and the shore is not to be attempted. Vessels leaving English Road should steer W.S.W., and may afterwards proceed as they please.

The easternmost extremity of Bonavista is East Sand Head, to the southward of which is Brazen Hill Point, which is remarkably bluff and perpendicular on each side, with a sandy beach. At somewhat better than 3 leagues to the southward is South Island and Point, both of which are low and foul. To the westward of this point is *Portuguese Road*, where there is anchorage in 6, 7, or 8 fathoms, with Platform Mountain or Hill bearing N.N.W., the south point S.E., and the landing N.E. by N., distant $1\frac{1}{2}$ mile. There is a reef that extends 3 miles off, from the point under Platform Hill, with the sea breaking on it. The hill bearing E.N.E. clears this danger.

LETON REEF.—This is a dangerous shoal, extending north and south, about 1 mile. From its centre the north point of Bonavista bears N.E. $\frac{1}{4}$ N. (N. 26° E.) $9\frac{1}{2}$ leagues, and the south point E. by N. (N. 64° E.) 7 leagues: it is about even with the surface of the sea, which breaks over it with violence except in fine weather; and soundings have been found around it, as will be perceived on reference to our particular chart of the Cape Verde Islands. The profusion of fish in its vicinity is incredible. The position of the reef is lat. $15^{\circ} 47' 30''$ N., and long. $23^{\circ} 10'$ W.

ILHA DE SAL, OR SALT ISLAND.—This is a long narrow island, about 16 miles in length, and is the north-easternmost of the Cape Verde Islands. Its north-western part appears high and irregular; the hillocks and vallies extend down to the water's edge, both on the eastern and western sides, while its south and south-east points run out in long sandy spits, very low and flat, and scarcely distinguishable at a distance. At a little distance to the northward of the S.E., or Wreck Point, is a rocky reef, stretching out about a mile from the land, on which the sea commonly breaks. Salt Island may be seen a great way off, and the Peak of Martinez near its north point will become visible, on a clear day, at the distance of full 60 miles, its height being computed to be 1600 feet.

There are no places of anchorage on the east side of the island; but on its western side are two bays, Palmira and Mordeira, the latter being considered one of the best among the Cape Verde Islands. Palmira Bay is shallow, and only frequented for its supply of fresh water, which is obtained from a well, affording about half a ton per day.

Mordeira Bay is about 4 miles to the southward of Palmira. In proceeding along the west shore of the island, from the N.W. Point to Mordeira Bay, you will have soundings all the way; within a mile of the shore are 15, 16, 17, and 18 fathoms; in Palmira Bay 5, 6, and 7 fathoms; and close to Bird Island 10 fathoms. Bird Island is small, and lies about a quarter of a mile off the shore, but there is no passage for vessels between. Mordeira Bay lies to the southward of Bird Island, and being surrounded by low land, it is not so subject to squalls, nor heavy swells of the sea, as the bays in most of the other islands are. Having rounded Bird Island, your best anchorage will be with Bird Island just shut in with the foot of the Lion's Head, distant $1\frac{1}{4}$ mile from the bluff land; observe there are many foul spots about, therefore care should be taken to ascertain the quality of the ground before you let go your anchor. The anchorage is safe during the N.E. breezes; you will ride in 15 or 16 fathoms, or lessen your depth by advancing towards the shore; the bay has plenty of fish and turtle, but there is no fresh water, nor could that article be procured by sinking casks in the sand.

From Mordeira Bay to the South Point of Sal is about 6 miles, and there are soundings all the way of 6 and 8 fathoms, at half a mile from the shore. The soundings off Turtle Point extend fully 2 miles out, at which distance there are 20 fathoms. Vessels sometimes take a temporary anchorage off the South Point in 7 fathoms, within half a mile of the land; but it will require you to be careful in going round the point, as it is very low, and has a spit extending from it, to which you should not approach nearer than into 8 or 9 fathoms water.

Sal Island has numerous salt ponds upon it, where the water crystalizes into a beautiful salt, forming an article of commerce; the land is otherwise nearly barren, producing only a few inconsiderable shrubs.

MAYO.—This island is about 4 leagues in length from north to south, rising most towards the centre. On approaching it from the S.E. its appearance is very different to that from the northward, for you first perceive two hummocks towards the north part, appearing like islands, but, as you approach nearer, the land is seen by which they are connected. Southward of these is a mountain, with very low ground to the south, over which are two hillocks. At half a league from the middle of the north side of the island is a reef, extending N.N.E. and S.S.W. three-quarters of a mile, which must be cautiously avoided.

On the S.W. side of Mayo is a sandy bay, named English Road, within which is the town with its extensive salt-pans. Ships may anchor here in 7 or 8 fathoms, the west point bearing N.N.W. (true) and south point S.E.; from hence the land appears with three conical hills to the N.E. Fresh water is here extremely scarce, and by no means good. Abreast of the town, and to the eastward of it, the shore is steep, bluff, and rocky: but to the westward a low white sandy beach extends to a rounding point, from which a spit of sand and coral stretches outwards, having at a short distance from its extremity no ground at 45 fathoms. The spit may be rounded in 16 or 17 fathoms, and a ship should not anchor further out than in that depth, the edge of the bank being steep. There is anchorage half a mile west from the town, in 11 or 12 fathoms.

ST. JAGO.—This is the most considerable of the Cape Verde Islands, and being the seat of government is better inhabited, and more frequented than the others; it is about 10 leagues in length and 5 leagues in breadth. The land is very high, and the eastern side is bordered with rocks, which lie near the shore, so that vessels may safely sail along at the distance of 2 miles. *The S.E. part appears as a long low point, when seen from the northward or*

southward; and 7 miles S.S.W. from this point lies the east point of Port Praya. Between the two, but nearer, lies a bay which so much resembles Port Praya that many vessels have been mistaken, and nearly lost, as it is a dangerous place; at the bottom of it are several cocoa-nut-trees, and a few houses. Between this place and Port Praya the land is mostly perpendicular, and though the fort of Port Praya, which stands on a cliff, is a mark, by which the true bay may be distinguished, yet the surest guide will be, that the north or east point of the false bay is surrounded with breakers, whereas the east point of Port Praya is high, steep, and free from danger: you must haul close round the point, and keep within a cable's length of the shore, to go to the anchorage in 7 or 8 fathoms.

Port Praya is a fine bay, lying between two points, which bear from each other about east and west, $1\frac{1}{2}$ mile apart. As you sail round the east point (Point Bicudas) you will soon open the forts at the bottom of the bay, to the westward of which, in a valley, are several cocoa-nut-trees, and a small house. The winds, except in the tornado season, are generally in the N.E. quarter, with frequent squalls; therefore a ship, on approaching the east side of the bay, should have her top-gallant-sails furled, and a reef or two in her topsails. The eastern shore of the bay is high, and all the land seems parched and barren; in the western part of the bay is a small black island, flat at the top, but rugged at each end, named the Isle of Quails, having a rocky projection from its south end, about half a cable's length; there is also a rocky ledge off the north end, where the water is in general shallow, for 3 fathoms is the greatest depth between this isle and the fort. Within, to the westward of the island, it is only navigable for boats.

From the west point of the bay, Punta de Tamaros, some rocks extend to seaward, which require caution to avoid, when sailing from the anchorage in the night. It is, therefore, more convenient to anchor nearer the N.E. side of the bay, than to the Isle of Quails, for the sake of more readily getting under sail, without running the risk of being carried by the currents upon the point of the rocks to the leeward, before the vessel has gained fresh way enough to steer clear of them. The best anchorage is in 7 or 8 fathoms, with the fort bearing N.W. by N. (N.W.) about three-quarters of a mile, the body of Quail's Island West, and the point of the bay, opposite Quail's Island, E. by S., the ground being coarse sand and gravel, but not holding well, consequently requiring a good scope of cable to bring the ship up: a kedge anchor should be let go to the west, in order to steady the ship, keeping the bower anchor clear when the wind is light from the west.

It has been observed, that "Quail Island, though centrally situated, is too near the main land to assist any one in finding the anchorage. Do not approach on any point nearer than half a mile, as the vicinity is rocky, and some rocks do not appear above the surface."

The Island of St. Jago, when bearing W.N.W. $\frac{1}{4}$ W., 8 leagues, appears very high. Mount St. Antonio, rising out of its centre, is of a conical form, and terminates in a peak, which peak, bearing N.N.W., leads to Port Praya Road; and as you advance westward, you will see the east end, which, as already observed, is very low. As a further guide, you will see an opening several miles north-eastward of the harbour, on Signal-post Hill, which gradually slopes to the westward; also, Red Hill, which is on the port side of the bay, N. by W. The town is situated on an eminence, rather high, and perfectly white, the houses being visible from S. by E. to S.W. by W.

It seldom rains here, but a dry haze is very prevalent. In December and January, the wind hangs sometimes far to the eastward, veering at times to the northward. In settled weather there are often regular land and sea breezes.

in the bay ; the sea breeze setting in near noon, and ending at 4 or 5 o'clock in the afternoon ; the N.E. wind begins towards evening, and continues during the night.

Ships bound from Port Praya to Bonavista, should endeavour to sail in the evening, as the current at that time is favourable. They should not stand too far over towards the African coast, nor work between Mayo and St. Jago, and they will then get to the eastward very rapidly.

FOGO or **FUEGO**.—This island lies 12 leagues to the westward of St. Jago, and appears like an immense mountain rising from the sea to a peak upwards of 7000 feet high. This mountain is volcanic, and its eruptions occasionally have sufficient violence to cause the inhabitants of the islands to retreat to the neighbouring islands for safety. The form of the island is nearly circular, and its extent is about 14 miles. The coasts are high and steep, and there is deep water a short distance from their base.

About 4 miles from the north end of the island there is said to be a sunken rock, but its existence is very questionable. The whole of the eastern coast is foul to about $1\frac{1}{4}$ mile off ; but the west side of the island, on which the town is situated, is clear. This little town is named Luz, and off it, about half a mile, is the anchorage in 25 fathoms ; but the ground is foul, which added to its exposure and the indifferent landing, renders the place very unsuitable for riding in.

At Lux, corn, fruit, and cattle may occasionally be purchased, but water is scarce, there being no running stream. The volcano may be sometimes seen at the distance of 34 leagues.

BRAVA.—This is nearly an oval-shaped island, lying 8 miles to the W.S.W. of Fogo. In comparison with the great height of the latter it appears low, although its land is high, and its mountains rise like pyramids, towering one over the other. In this island there are several bays and harbours, the best of which, named Furna, lies at the N.E. end of the island, and will accommodate small vessels, affording them protection from all winds but the S.W. Along the whole coast there is generally a heavy surf, and the landing is bad. The island produces good water, and an abundant supply of live stock, corn, and fruit ; although there is but little wood. There is also an abundance of salt, and more saltpetre is procured here than from any of this group of islands. The natives are few, and all black ; they are harmless, hospitable, and generous.

At about $5\frac{1}{4}$ miles to the northward of Brava are two rocky islets, named Rombo or Romes Islands, which are nearly connected together by a reef ; but the passage between them and Brava is clear. The westernmost island is high, and has a peak on it.

ST. NICHOLAS.—This island is about $8\frac{1}{4}$ leagues in extent, lying in an east and west direction, and is of very irregular breadth. Its eastern point is distant 19 leagues from the south-west extremity of Sal, and appears like a sail, being a platform point with a high pyramidal rock near it.

At about $4\frac{1}{4}$ miles from the east point of the island is Freshwater Bay, on the southern coast, where there is anchorage in 7 fathoms at half a mile from the shore. There is good landing for the boats, with plenty of good water in fine weather, and at neap tides : for as the tides rise here 5 or 6 feet, on the new and full moon, the pond is then overflowed. At this time you are subject to heavy squalls ; and, notwithstanding the wind blows off shore, the sea is very high close to the beach. St. George's Bay, which is 12 miles to the westward of the latter, is known by its conic or sugar-loaf mountain, to the left of which there is another mount, with a flag-staff on the summit. *Anchor on the north side, in 6 or 7 fathoms, close to the shore, by which a*

rocky ledge, which stretches from the east point, will be avoided: the best situation will be the sugar-loaf hill bearing N.E. by E., the flag-staff N.W. by N., and the cove, or landing-place distant a quarter of a mile N.W.

Terrafal Bay lies on the south-west side of St. Nicholas, and has regular soundings within it, from 14 to 5 and 4 fathoms, near the shore, sandy bottom: the custom-house stands on the south-east corner of the bay. Anchor in 15 to 10 fathoms, bringing the Islands of Raza and Branco in one, bearing W.N.W. $\frac{1}{4}$ N., and the landing-place distant a quarter of a mile E. $\frac{1}{4}$ N. From Terrafal Bay to the west point of St. Nicholas, there are soundings of from 40 to 20 fathoms, at a short distance from the land: a vessel may anchor in 30 fathoms, at a mile S. by W. from the west point, when it blows from the N.E., but that is the only quarter it is sheltered from. By digging a well, almost anywhere on the low land, you may water here, unless the rainy season has failed; but there is always water in the valley, about half a mile from the sea, whence the natives will bring it down on asses for a trifle. From this road you may see, in clear weather, all the leeward islands; but if it be in the least hazv, the Isle Raza is not discernible.

RAZA OR **CHAON** is distant $8\frac{1}{4}$ miles to the westward of St. Nicholas. It is of a square form, about 2 miles in length, and $1\frac{1}{4}$ mile broad, and is of a rugged mountainous nature, and uninhabited. The landing-place is under the N.W. point, facing the west. Between it and Branco, at about one-third from Raza, is a coral reef, extending S.S.W. and N.N.E., and having on its shallow part 6 fathoms of water, but deepening gradually on the west to 15, and on the east to 18 and 20 fathoms. The sea continually breaks over the reef, owing to a strong tide or current setting through between the isles.

BRANCO OR **REDONDA** is a long narrow island, about $2\frac{1}{4}$ miles in length, of a similar description to that of Raza, from which it is divided by a channel of 18 to 6 fathoms, about 3 miles wide. There is no safe landing at Branco, as its shores are all rocky, more particularly towards the S.E. end, from whence there stretches a sandy spit.

ST. LUCEA.—About 4 miles to the northward of Branco lies St. Lucea; between is a bank of soundings, forming, towards the latter, a regular flat of 10 to 12 fathoms. The south coast trends nearly east and west, 4 miles, and in the middle of it is a good landing-place. A steep bank, half a mile broad, stretches from it, having on its edge 2 to 4 fathoms. In the bay formed by the S.W. coast, small vessels may anchor, being sheltered from all points but the South and S.E. The beach is sandy; the anchorage small pebbles and sand. In the middle of the bay is an islet named Leon, with the ruins of a village on it. The N.W. part of St. Lucea rises into high mountains.

ST. VINCENT.—Porto Grande, on the N.W. side of the island of St. Vincent, is considered one of the largest and best bays among the Cape Verdes; the anchorage is safe and good, and is sheltered both from wind and sea. The wind generally blows from the N.E. over a part of the land, and seaward it is protected by St. Antonio, which is distant about 8 miles. The church and custom-house stand at the bottom of the bay on the east, and a signal-post is erected on a hill a short distance from the anchorage. Without the entrance of the bay, at about two-thirds of a mile from its north-west point, is Bird Island, which is very steep, and appears at a distance like a sugar-loaf; this may be passed on either side, and hence you will find regular soundings towards the shore. The ground is good in most parts of the bay, and you may anchor anywhere in 7 to 6 fathoms, sandy bottom. It is advisable to moor with a kedge, as a strong current often sets to N.E. between Bird Island and the shore.

St. Vincent is divided from St. Lucea by a channel 4 miles wide. The

island stretches 12 miles east and west, and is about 7 miles in its broadest part. The N.E. coast forms two bays, separated by a low peninsula; but as it is hereabouts altogether dangerous, it needs no farther description. On the S.W. side of the island is the Bay of St. Pedro, having a fine sandy beach, where vessels may anchor in 10 fathoms, near the middle of the bay, or rather more to the westward. The anchorage is good in the dry season, and the inhabitants say there is plenty of wood and water. On the eastern side of the island is another anchorage, the Praya de Gatta with a sandy beach, near which vessels may anchor in 6 fathoms; the bottom is clear, but a sea sets directly in when the wind is either N.E. or S.E., the Island of Santa Lucea sheltering between these points. This bay and coast are without wood, water, and inhabitants.

ST. ANTONIO.—This island is divided from the former by a safe channel, 8 miles wide. St. Antonio is remarkably high, particularly towards the north-west, where there are two high mountains, the highest of which is named the Sugar-loaf, and is generally overcapped with clouds. The town and bay of Santa Cruz are situated on the south-east side, but the anchorage is bad, with a spit on the side. Terrafal Bay, towards the south-west side, is well supplied with good water, and other necessities may here be purchased.

St. Antonio may be descried, in clear weather, 18 leagues off, and appears high, bleak, rocky, and barren, which, in fact, it really is, even when you approach near it. The south-west point is pretty well covered with brushwood, but there is little appearance of verdure or cultivation.

WINDS, CURRENTS, &c.—In the vicinity of the Cape Verde Islands, the winds are generally from the north to the east, becoming light and variable as the sun approaches the zenith, accompanied with thick hazy weather, some distance from the land; but near which, in the bays and harbours, except during the rainy season, there are sea and land breezes; the former blowing from 11 to 12 o'clock in the forenoon, until 4 or 5 in the afternoon, when the land-wind succeeds.

The *rains* commence about the middle of August, and continue, without intermission, until November; during which period the winds are strong from the South and S.W., with frequent heavy squalls; and it is during these months that the inhabitants are so oppressed with sickness and fatal diseases. Throughout the year, there is a constant atmospheric humidity, from which is deposited an abundant proportion of vapour, which circumstance accounts for the temperature of the climate, and the extreme luxuriance of vegetation in these islands.

The *currents* in the neighbourhood are, for the most part, strong to the S.E.; vessels, therefore, bound from the north ought to make allowances accordingly, making the Island of Sal first, from whence they may, with facility and greater security, direct their course to any of the others. The current, however, has occasionally been found to run to the N.E., in which case, serious errors will often occur, and which, perhaps, experience only can guard against. The force of the current is commonly three-quarters of a knot.

There is a certain proportion of the sea, 3 or 4 degrees southward, and 6 degrees to the westward, from the the Cape Verdes, extending to the Equator, which seems condemned to perpetual calms and heavy rains, and which, in the words of Lieut. Bold, may be accounted for in the following manner:—“The sun, in his course from east to west, occasions a powerful rarefaction of that proportion of the atmosphere immediately in his vicinity, causing a constant stream of wind, which rushes after him from the east, to supply and *equalize the rarefied medium*. This wind, crossing the continent of Africa,

loses its power, in traversing such an extensive heated body of land, and separates into two veins, which are termed the N.E. and S.E. trades; in consequence of which, the intermediate space, which is specified above, as far as the conflux of the winds, is a constant state of inaction, receiving from every side the proximated passing clouds, which settle and deposit their waters with sometimes the most unabated fury.

The motions of the two elements, wind and water, are found to operate in exactly a similar manner; therefore, at the meeting of these winds, as at tides, there is an irregular motion caused, creating eddies, &c., which give rise to those sudden various gusts and rains, that vessels experience in traversing the equator from the N.E. and S.E. trades, and *vice versa*."

TIDES.—It is high water on the full and change of the moon, among the Cape Verde Islands, as follows:—English Road, Bonavista, at half-past seven—tides rise 5 feet; Mordeira Bay, Sal, at three-quarters after seven—rise 5 feet; Porto Praya, at six o'clock—vertical rise about 4 feet; St Nicholas, at seven, and the tide rises 6 feet. Variation at St. Antonio, in 1826, was found to be 16°; at Port Praya, 14°, W.

THE BERMUDAS, OR SOMERS' ISLANDS.

These islands derive their name from the supposed discoverer, Juan Bermudez, a Spaniard, who is said to have touched there in 1522; or, as it is in May's account, from a Spanish ship, named Bermudas, being cast away there. The first printed account of them in English seems to be by Henry May, who, being on board a French ship, commanded by M. de la Barbotier, was wrecked on them, in 1593. The second and less common appellation is from Sir George Somers, who was driven upon them, in 1609, on his voyage to Virginia. They consist of a numerous group of islands and rocks, being surrounded with dangerous reefs, nearly even with the surface of the water, some of which extend 8 leagues to seaward, so as to render the access extremely difficult; in addition to which, the land is low, and a current frequently sets towards them from the S.W. The Bermudas extend N.E. by E., and S.W. by W., about 20 miles, and are of various breadths, being shaped in the most irregular manner imaginable. Including the small ones, the number of islands is very great, but the large ones may be considered to be five in number, viz. —St. George's, St. David's, Long Island (or Bermuda), Somerset, and Ireland. There are two towns, each of which has its mayor, and civic officers, St. George's, on the island of that name, to the N.E., and Hamilton, on the large island (or continent, as it is generally called), about the centre of the group. They are both well built of white stone; St. George's, which is the larger, contains about 500 houses, a church, the town-house (in which both branches of the legislature hold their sittings), a library, and other public buildings. The whole group is divided into nine parishes, each of which sends four members to the House of Assembly. The scattered houses and hamlets are so numerous, that the whole island has the appearance of one continued village.

There are no springs or fresh water streams in the islands, and but few wells, the water from which is brackish; each house has its own tank to which the roof serves as a conductor for the rain; and on the island of St. George's are large tanks for the supply of shipping.

The climate of the Bermudas is that of a perpetual spring, mild, genial, and salubrious; though during southerly winds, which are the most prevalent, the atmosphere becomes charged with a humidity unfavourable to constitutions predisposed to rheumatism, gout, or pulmonary affections. The fields and trees are always green; but the predominance of the cedar, while it refreshes the air with its fragrance, imparts its dark hue to the landscape. Snow seldom falls, and rains are not frequent, though heavy while they last. The islands are, however, very subject to tempests, thunder-storms, and hurricanes, especially during the autumn,—a circumstance that may be attributed to their situation on the verge of the trade-wind, where variable and disagreeable weather always occurs.

There is not an insular group on the whole globe so protected by nature, from the effects of a boisterous ocean, as the Bermudas. They are surrounded by dangerous rocky reefs, extending in some parts 10 miles from the islands, which render them very difficult of access. The few channels through the reef are thickly studded with coral rocks, but the water is so beautifully clear, that they are visible to the eye; and the Negro pilots, looking down from the bow of the vessel conduct her through the labyrinth with a skill and confidence only to be acquired by long habit.

There are four Signal Stations on the islands:—One at St. George's, the head quarters on the east; another at Mount Langton, near Hamilton; another on the south-west coast, at 3 miles from the south-west end of the islands; and the other at Gibbs' Hill, on the west coast. At each a small party of soldiers is stationed. There is also a flag-staff at the commissioner's house in the dock-yard in Ireland's Island, which communicates with Mount Langton, and through that to the other stations. The population is between 9,000 and 10,000, somewhat more than half of which are whites, of whom nearly two-thirds are females.

SAILING DIRECTIONS.—In running from the eastward for these islands, the best parallel is between $32^{\circ} 10'$, and $32^{\circ} 20'$; a ship may then run on boldly, as there are no rocks at any distance from the land. With a large wind, and approaching land towards the right, no vessel should lie-to, but rather turn to windward under an easy sail till morning, as the current may take you unexpectedly among the rocks. It is also to be observed, that the islands are low, and cannot be discerned far; added to which, a thick haze is often prevalent. Under these circumstances, it will be at all times proper to be correct in ascertaining your latitude, as making the land is somewhat difficult, and at times precarious.

As the prevailing winds in these seas are commonly between the south and west, vessels from the westward generally run for these islands, in about the parallel of $32^{\circ} 8'$. Steering East, the first land seen will be Gibbs' Hill to bear E.N.E.; and when within 6 miles of the land, take care it is not to the eastward of that bearing, because of the rocks named the Long Bar. Steer then so as to pass within 2 miles of the south-east land, and when Wreck Hill shuts in behind the south land, you are clear of the south-west breaker, and may steer along the south-east side, at a mile distant from the shore, until abreast of St. David's Head.

On coming from the westward, the south-west points of the land ought to bear E.N.E. before you come within 4 leagues of the land, when you may *steer directly for it without danger*. The breakers on the south side always

show themselves, so that a ship may safely approach within gun-shot, from the south-west end to the south-east; and when getting to the eastward of the castle round into St. George's, do not go farther to the northward than to keep Cooper's Island open within St. David's Head, till you take a pilot.

The rocks and islands of the Bermudas lie N.E. by E. and S.W. by W., about 9 leagues, and in breadth about 5. Wreck Hill forms the west point, and St. David's Head the east. The W.N.W. and north sides are encumbered with a dangerous and continued ledge, beginning at the Long Bar, the south part of which lies 6 miles, W.S.W., from Gibbs' Hill; trending then N.E., it is named the Chub-heads, which off Wreck Hill lies 9 miles from shore; it thence extends to the North Rock, and rounds East and E.S.E. to Mill's Breaker, which dries at low water and lies N.E., 6 miles, from Catharine Point. There are soundings round the outer edge of this ledge from 9 to 14 fathoms. There are soundings also 2 miles from the shore, round the N.E., East, and S.E. sides of the Bermudas; and as the water hereabout is deeper, vessels suspecting themselves in the vicinity of the islands, would do well to keep the lead going, being assured that at 13 or 14 fathoms, they will strike the ground in time to avoid danger.

MURRAY'S ANCHORAGE lies on the south-west side of Catharine Point, extending from Tobacco Bay to the ferry: the common entry is through an intricate narrow passage round the point; the ground consists of stone of the drip-stone kind, as fine as flour, mixed with a shelly substance and chalky clay, and is very heavy. In the event of not getting a pilot off Castle Harbour, you may run as far as St. David's Head; and when to the eastward of which, stand no farther northward than to bring the head to bear N.E., or you will see a white sandy bay to the southward of the head, between it and Castle Harbour. In standing to the northward, care must be taken to shut no part of this bay in behind St. David's Head. The west land of Bermudas will be shut in behind the land over this bay, before this mark comes on. In the night, when waiting here for a pilot, the best precaution is the lead, for, if care be taken, and the ship is not running too fast through the water, you will be sure of striking ground in time to avoid danger. There is a rocky bank lying from S.S.W. to S.W. from Gibbs' Hill, from 3 to 5 leagues distant, with various depths of water, from 16 to 40 and 45 fathoms.

The following particulars are extracted from Cotter's Sketches of Bermuda, 1828:—"The principal places of anchorage are St. George's Harbour, with a bar, over which at high water spring tides are 19 feet, but deep enough within that for ships of any burthen. Murray's Anchorage, extending from St. Catharines's Point to the ferry, the entrance to which is very intricate, but is well marked with buoys; this is the channel to Grassy Bay. Off the dock-yard, in Ireland Island, is the general rendezvous for H.M. ships; and also Hamilton, situated at the head of the Little Sound. Castle Harbour was formerly the place assigned for men-of-war, but this has been discontinued since the loss of Cerbus frigate, which struck on a rock, in endeavouring to get out to chase an American privateer.

Ships may approach within a mile of the land on the south side, there being no hidden danger; but on the north side there is a reef of coral, about 3 leagues from land, extending from the North Rock, bearing true north from from St. Catharine's, to the western extremity of the colony. There is, however, a passage through, abreast a point named Wreck Hill, in Somerset parish, which is only frequented by vessels of light draught of water. There is also a passage near the North Rock, but which is never resorted to except in cases of great necessity.

Many skilful mariners and pilots are of opinion that Grassy Bay is not well chosen as an anchorage for H.M. ships. The channel from St Catharine's Point is almost daily reduced in width and depth of water, owing to the influx of sea-weed in the Great Sound, and the rapid growth of coral; besides, ships have been detained several days, in consequence of the wind not answering, to enable them to get through the intricate channel from Murray's anchorage.

No stranger of common prudence would attempt any of the anchorages without a pilot, many of whom are always on the look-out, and put to sea when a vessel heaves in sight. Their boats are easily known, being of a peculiar construction and rig. They are of a light draught of water forward, but have what is called a long heel or deep stern-post, and are rigged with one mast and bowsprit, carrying a triangular mainsail, a foresail, and jib, and occasionally a gaff topsail and square-sail.

LIGHTHOUSE.—On the 1st of May, 1846, a revolving light was established on the southern part of Bermuda, in lat. $32^{\circ} 14' N.$, long. $64^{\circ} 51' W.$ Every minute it brightens up into a strong glare, which continues for 6 or 8 seconds; and as it is 365 feet above the level of the sea, it can be seen 7 or 8 leagues. The light can be seen on all bearings of the compass, except those between N. $64^{\circ} E.$, and N. $74^{\circ} E.$, where it is intercepted by high land. Within the distance of 7 miles a faint but permanent light can be seen between the brilliant flashes.

At night, or in thick weather, it is advisable not to make Bermuda to the north of $32^{\circ} 8' N.$, until the light or land can be seen. In coming from the eastward, the light should not be brought to the southward of W. by S., nor approached at night nearer than 6 or 7 miles. While coming from the westward the light should not be approached nearer than 12 miles, unless first brought to bear to the northward of N.E. by E. A vessel making the light to the southward should haul off immediately, as reefs extend from it to a distance of 16 miles to the northward.

To this may be added the following remarks by Captain Barnett, R.N., August, 1846:—

Bermuda Lighthouse stands in $32^{\circ} 15' 4'' N.$, long. $64^{\circ} 51' 36'' W.$ Horizon intercepted between N. $43^{\circ} 24' E.$ and N. $47^{\circ} 34' E.$ by one hill, and between N. $49^{\circ} 7' E.$ and N. $57^{\circ} 35' E.$ by another hill; these being the true bearings, and the variation of the compass being $27^{\circ} 0' W.$ The light may be seen from an elevation of 10 feet, 23.6 miles; 20 feet, 25 miles; 40 feet, 27 miles; 80 feet, 29.8 miles; 100 feet, 30.9 miles supposing no refraction in the atmosphere at the time.

Variation of the needle, $27^{\circ} 1' W.$; dip of the needle, $62^{\circ} 26' 15'' N.$

TIDES.—It is high water, on the full and change, at St. George's, at 8 o'clock; spring tides rise about 6 feet, common tides only 4 feet. The tides are various, both in height and time, at different parts of the island.

ROCKS, SHOALS, AND DANGERS IN THE NORTH ATLANTIC OCEAN.

 *The Notes referred to will be found subjoined.*

NAMES.	NORTH LAT.	WEST LONG.	REMARKS.
	DEG. MIN.	DEG. MIN.	
To the N. of 40°			
Kramer's Bank	59 45	16 40	Doubtful. <i>Vide Note 1.</i>
Rockall	57 40	13 30	Two leagues E.N.E. $\frac{1}{4}$ E. of Rockall is Helen's Reef. <i>Note 2.</i>
Lion's Bank	56 40	17 45	Soundings obtained by Lieut. Pickers- gill, 1776.
Vigia	56 30	16 0	Doubtful.
Aitkin's Rock	55 19	9 58	Doubtful. <i>Note 3.</i>
Brasil Rock.....	51 10	16 0	A high rock, steep-to, seen in 1791.
Negre's Rocks.....	48 7	21 0	Position not accurately determined.
Three Chimneys.....	47 54	29 40	Supposed to lie in the position here stated. <i>Note 4.</i>
Chapelle Rock	47 43	8 4 $\frac{1}{2}$	Seen in 1786 and 1842. <i>Note 5.</i>
Jaquet Island	46 50	39 30	Supposed to be an Iceberg.
Devil's Rocks	46 36	13 8	Seen in 1829 and 1842. <i>Vide Note 6.</i>
Shoal on the Banks of } Newfoundland .....	...	...	<i>See Note 7.</i>
Virgin Rocks	46 26 $\frac{1}{2}$	50 56 $\frac{1}{2}$	Ascertained in 1829. <i>See Note 8.</i>
Maida	46 10	19 40	Considered doubtful.
Mariners' Rock	46 0	29 37	Seen in 1831. <i>Note 9.</i>
Barenthy's Rock	45 42	37 25	Doubtful.
I. Verte, or Green Isld.	44 52	26 25	Said to be last seen by Capt. Coombes, ship Pallas.
Rock	44 38	11 42	To the N.W. of Cape Finisterre, doubtful.
Five Heads	44 15	19 25	Very doubtful.
Greeve's Rocks	44 15	25 5	Position uncertain.
Midgley Shoal.....	44 9 $\frac{1}{2}$	22 57 $\frac{1}{2}$	Capt. T. Midgley, 1838.
Vigia	44 0	39 20	Doubtful.
Indemnity, or Wood- } all's Rock	43 20	25 10	{ Ship Indemnity, September, 1829. <i>Note 10.</i>
Vigia (Ramigeau's).....	42 45	37 25	Probably not in existence.
Vigia	42 45	37 16	Doubtful.
Beaufort Bank.....	42 37	41 45	<i>Vide Note 11.</i>
Amplimont Rocks	42 31	24 3	Position not well determined. <i>Note 12.</i>
Druid's Reef	41 19	41 35	Discovered in 1803. <i>Note 13.</i>
Persus' Shoal	41 3	22 30	Ship Perseus, 1813, breakers seen.
Hervagault's Breakers...	41 2	49 23	<i>See Note 14.</i>
Daraith's Rock	40 50	54 53	Longitude uncertain.
Gough's Rocks	40 28	33 0	Seen by Captains Gough and Birch.

NAMES.	NORTH LAT.	WEST LONG.	REMARKS.
	DEG. MIN.	DEG. MIN.	
To THE N. OF 40°			
Shoal	40 26	36 10	Uncertain.
Shoal	40 22	42 50	Doubtful.
Watson's Rock	40 18	53 40	Captain Watson, 1824. <i>Note 15.</i>
Cashe's Ledge.....	...	...	<i>Note 16.</i>
Jeffrey's Bank.....	...	...	<i>Note 17.</i>
St. George's Bank .....	...	...	<i>Note 18.</i>
BETWEEN 20° AND 40° N.			
Candler's Rock	39 47	35 0	Supposed to be an Iceberg.
Breton's Rock.....	39 40	41 35	Position not well determined. <i>Note 19.</i>
Hilton Rocks	39 18	35 50	<i>Note 20.</i>
Hume's, or Munn's Reef	39 0	64 20	Brig Joseph Hume, 1827. <i>Note 21.</i>
Whale Rock	38 46	25 0	Breakers seen, 1809.
Pronte Rocks	38 32	33 16	<i>Note 22.</i>
Vigia	38 30	38 15	Situation uncertain.
Princess Elizabeth, or } Chantereau's Shoal }	38 16	39 49	West of the Azores. <i>Note 23.</i>
Potomac's Soundings...	38 10	67 26	Captain Smith of the Potomac, 1838.
Rocks near the Azores...	37 56	33 4	Brazilian brig Constante. <i>Note 24.</i>
Vigia	37 50	34 18	S.W. of Flores. Considered doubtful.
Fields' Vigia	37 31	66 0	Doubtful.
Tulloch Rocks	37 27	24 45	Discovered in 1808. <i>Note 25.</i>
Formigas.....	...	...	See the description of the Azores.
Jean Hamcri's Rock ...	36 54	19 49	Doubtful.
Dædalus' Rock	36 30	9 16	Position very doubtful. <i>Note 26.</i>
St. Mary's Bank	36 0	27 16	Shoal of white water, S.W. of St. Mary.
Orica Rock	34 51	72 28	<i>Note 27.</i>
Kutusoff Bank	34 50	23 33	West of St. Mary's Bank, 1816.
The Eight Stones	34 45	16 35	Doubtful. <i>Note 28.</i>
Ashton Rock	33 48½	71 41½	Captain H. B. Grey, 1824. <i>Note 29.</i>
Desertas .....	...	...	See the description of Madeira.
Dyet Rocks	32 46	59 0	<i>Note 30.</i>
Steen Ground.....	32 30	21 15	Westward of Madeira, doubtful.
Rocks eastward of Ber- } mudas .....	...	...	Position questionable. <i>See Note 31.</i>
Josyna Rock	31 40	23 45	Supposed to be seen, 1805. <i>Note 32.</i>
Vankeulen's Rock	31 30	36 50	Doubtful.
Vigia	30 53	27 12	Doubtful.
Harcourt, or Huntly's } Rock	30 49	78 27	<i>Note 33.</i>
Cleveland Rock	30 45	10 24	Off Cape Geer, 9 leagues from land. <i>Note 34.</i>
The Salvages .....	...	...	Near Tenerife. See page 262.
Inglefield Bank	29 42	80 17	Captain S. H. Inglefield, 1810.
Gandaria Reef.....	29 30	37 18	<i>Note 35.</i>

NAMES.	NORTH LAT.	WEST LONG.	REMARKS.
	DEG. MIN.	DEG. MIN.	
BETWEEN 20° AND 40° N.			
Mourand's Bank.....	24 34	65 10	Capt. Mourand of Nantes, 1773.
Stamina Rock	24 20	64 50	Doubtful, probably the foregoing.
Livingston's, or Tul- loch's Overfalls.....	24 11	61 44	Capt. Tulloch, 1819.
Gombaud's Rock.....	23 15	32 25	Gombaud, 1760; doubtful.
Superb Bank	21 0	69 8	N.E. of Silver Kays
Three Cays.....	20 41	70 10	Brig Augusta, 1829, 15 miles N.W. of Silver Kays.
Guigou's Bank	20 50	66 45	Forty-five leagues to the northward of Porto Rico, doubtful.
Navy Bank	20 10	68 50	Seventeen fathoms S.E. of Porto Rico.
Hanna's Breakers	20 0	63 45	To the northward of Anegada.
BETWEEN THE EQUATOR AND 20° N.			
Maria Rock.....	19 45	20 50	Doubtful. <i>Note 36.</i>
Bom Felix	19 15	20 40	Shoal of 4 and 5 feet N.W. of Cape Verd, doubtful. <i>Note 36.</i>
Clowes' Reef	19 17	65 50½	Calédonia, Capt. Clowes, 1825.
Betsy's Rock	18 7	50 0	Seen by the Betsey, 1808, doubtful.
Martin's Reef	16 44	58 50	Supposed to be two miles in extent, 1823.
Bonetta Rock	16 32	20 37	Doubtful. <i>Vide Note 36.</i>
India Shoal.....	16 7	27 23	Position uncertain.
Maalstrom	16 0	37 0	Uncertain.
Galleon's Bank	15 56	49 40	Discovered by Longueville, the pilot of the San Fernando, 1730.
Leton Rock.....	15 48	23 13	Dangerous reef even with the water.
Webb's Rock	15 45	21 15	Doubtful.
Dubrueil's Rock	14 50	29 40	Ditto.
St. Esprit Reef	14 37	58 59	Very doubtful.
Garcia Rock	13 0	29 50	Doubtful. <i>Note 37.</i>
Galissionere's Rock	12 10	54 49	Somewhat doubtful.
Texeiro's Shoal	12 0	33 28	Supposed to be seen 1810, doubtful.
Five Palmas or Hin- man's Shoal	12 0	27 20	Doubtful.
Patty's Overfalls	11 0	24 30	Ditto. <i>See Note 36.</i>
Delaware Shoal	10 37	60 3	Eastward of Trinidad. <i>Vide Note 38</i>
Hannah's Shoal	10 7	27 32	Brig Hannah, 1824.
Longchamp's Rock.....	9 47	30 0	Doubtful.
Warley's Shoal	5 4	21 25	Ship Warley, 1813. <i>Note 36.</i>
French Shoal	4 5	20 35	Doubtful. <i>See Note 36.</i>
Cesar's Breakers	2 0	22 18	Considered very doubtful. <i>Note 39.</i>
Blaesdale's Reef	0 57	41 6	<i>Vide Note 40.</i>
St. Paul, or St. Pene- do St. Pedro.....	0 55	29 19	{ A group of five steep craggy rocks. Note 41.

NOTES TO THE PRECEDING TABLE.

1. **KRAMER'S BANK** is said to have been discovered by Captain Alof Kramer, in 1751, but Captain Ross sought for this bank, unsuccessfully, in 1818. "Continuing our course," says he, "on the 8th of May, to a spot where a bank is laid down in Steel's chart, as discovered by Alof Kramer, we could find no soundings in 130 fathoms, anywhere on or near the place."

2. **ROCKALL.**—This rock has been seen many times, but its true situation was unknown until the year 1810, when it was ascertained by Mr. T. Harvey, master, and the other officers of the *Endymion* frigate, commanded by the Hon. T. B. Capel. It is a large high rock, of a conical, or sugar-loaf shape, the summit, or upper part, of which is perfectly white, from an immense quantity of birds' dung, with which it is covered.

3. **AITKIN'S ROCK.**—On the 16th of July, 1740, at seven o'clock at night, in a passage from Virginia, on board the *Friendship of Ayre*, John Aitkin, master, James Lockhart, mate, coming in at the N.W. channel of Ireland, going under reefed foresail, wind at N.N.W., steering E. by S., saw by the weather-leech of the foresail, a rock under water, about 4 feet, distant 40 or 50 yards, to the best of their judgment, the ship running 6 knots by the log, with a heavy swell from the N.W.; all hands being on deck saw it plainly: next morning made the land, between Ennistrahul and Tory island, at about 8 o'clock; supposed to lie in the lat. of $55^{\circ} 18' N.$ and long., from the meridian of London, $11^{\circ} 14' W.$ From Tory Island W., distant 94 miles, without allowance of variation.

We have other accounts of this rock; and of these one states its position at $55^{\circ} 15' N.$ and $10^{\circ} 40' W.$, a part appearing at 3 feet out of water, with soundings of 30 to 40 feet a short distance; at 30 fathoms off no soundings with a line of 150 fathoms. In or about the year 1804, Captain Clarke, since of the *Harmony of Ayr*, believes that he saw the rock very distinctly; by his run it appeared to lie 20 leagues nearly true west from Tory Island. Captain James Reid, of the *True Briton*, says, "On Wednesday, the 27th September, 1826, when steering E.S.E., a man at the mast-head called out that there were breakers close to our larboard bow. I immediately hauled the brig up S.S.E. to clear them. In the run of the sea, a rock appeared a little above the water, nearly flat, about 90 feet long and 40 broad; saw no breakers excepting round the rock, and could distinctly see the sea working over the rock. We sailed from the rock 11 miles, S S.E. per compass, and ob. m latitude $55^{\circ} 17' N.$ We then bore up E.S.E. 36 miles, and E. by S. 6 miles, when Tory Island bore per compass S.W. $\frac{1}{4}$ W. $1\frac{1}{4}$ mile."

H.M.S. *Gannet* was sent to examine this danger in 1824; the *Harrier* and *Badger* in 1827; and the *Pylades* and *Dispatch* in 1829; but the rock was not discovered. Again, in 1830, the *Onyx* and *Leveret*, two gun-brigs, commanded by Lieutenants Dawson and Worth, and directed by Captain A. T. E. Vidal, were engaged on this service. "They put to sea on the 6th of June, when the moon was at the full, and, commencing their examination at Tory Island, proceeded nearly along its parallel of latitude to the westward of all the given positions of the rock. The two vessels were always in company, and the general practice was to sail on parallel lines, distant from each other one mile to one mile and a half by day, and, closing at night, to half a mile, or as much less as the state of the weather rendered necessary. During the few hours of darkness experienced at that season of the year, the vessels were *hove-to*, that no part of the suspected ground might be passed unseen, and *the leads were kept going*, both day and night, from the depth of 150 to 200

fathoms. Their distances from each other were determined every hour, by the angle of elevation subtended by their respective masts, at the heads of which balls had been placed to facilitate the measurement. Their mutual bearings were taken at the same time; and men were kept constantly at the mast-heads during the day, and a vigilant look-out preserved through the night.

The parallel of latitude of Tory Island, as above mentioned, was first carefully examined, to the westward of all the positions of the rock, and then traversed back again. These runs were laid down on the chart, and then other lines traced, until the whole space was explored, as there exhibited. This system of crossing and re-crossing over every part of the suspected ground, was persevered in, until the 31st August; when, having visited every position assigned to this danger, and indeed the whole space comprehended by them, without seeing any rock, or discovering any detached bank, which could indicate its having existed, the search was relinquished, and the vessels returned to England."

4. THREE CHIMNEYS.—Mr Heron, of Greenock, in 1824, says, "I am informed by the master of a merchant-vessel that the Chimneys actually exist, for a whole watch, as well as himself, saw them. They were seen about twilight, and three heads were distinguished. From an observation taken at the preceding noon, it was inferred, that their latitude, as laid down on the chart, is very near the truth."

5. CHAPELLE ROCK.—ABSTRACT FROM THE LOG OF THE BRIG GRACE DARLING, OF LIVERPOOL, JAMES TASKER, MASTER.—"9th August, 1842. At 1h. 30m. p.m., breakers seen close to the vessel, and a sunken rock observed distinctly and repeatedly above water, in the hollow of the sea, which clashed together and broke much. Supposed the rock might be about 4 feet below the usual sea level. It was witnessed by the whole crew of the vessel, which passed within her own length to windward of it, then going about $7\frac{1}{2}$ knots. Supposed it to be the Chapelle Rock, of 1786; its circumference appeared to be about 40 feet; it was of a sandy colour, like freestone, and no weed appeared on it. All on board were much alarmed. Latitude *in*, carried on from a good meridian observation, $47^{\circ} 43' N.$, and longitude, reduced from chronometric observations, at 9h. 30m. a.m. and 3 p.m., $8^{\circ} 4' 30'' W.$ The chronometer was No. 2050, by Mr Henry Frodsham, from whom her rate had been obtained only nine days before, and its accuracy subsequently confirmed by excellent distances of sun and moon, on the 27th August; and again by making Deseada on the 5th September. So the existence of the rock in the assigned position may be relied on."—*Nautical Magazine*, 1843, page 48.

6. DEVIL'S ROCKS.—Captain Henderson, of the ship Fortescue, on a voyage from the island of Mauritius to London, in 1829, states, "On the 25th of April, steering N.E., close hauled, after experiencing contrary winds for several days, about 4 p.m., while observing the sun's altitude for chronometer, I was alarmed by a cry of 'a rock on the lee-bow.' I immediately ran to leeward, and observed a rock of a brown colour, about 12 feet long, and nearly as much in breadth, about 2 feet above water. We observed the water to recede around it. Being rather squally, and fearing that some other unknown danger might be around us, prevented me from sounding. The latitude, at 4 p.m., carried on from meridian altitude that day, was $46^{\circ} 33' N.$, and mean longitude, by lunar observations the same morning, by the sun, moon, and chronometer, was $13^{\circ} 2' W.$ As these things are considered imaginary, I only have to observe that this danger certainly exists very near the position mentioned."

Subsequently to the above being made public, another captain writes from Madeira:—"On the day I sailed from Liverpool, it was published in the *Mercury*, that the Devil's Rocks, which had not been seen since 1764, had been discovered by the Fortescue, of Dublin, and stated to be in latitude $46^{\circ} 33' N.$, longitude $13^{\circ} 5' W.$ This determined me to look out, and I accordingly discovered them when within two miles of them. We saw the water breaking upon them, very high, and as it receded, the rocks were discernible; we were going nine knots at the time, and had the wind not been very strong, I do not think they would have been observed. In fine weather, I am of opinion that the water would not break upon them. I did not heave to, when I neared them, to take an observation, but made one soon after; and from the distance we had ran, I made them lie in latitude $46^{\circ} 36' N.$, longitude $13^{\circ} 8' W.$, being nearly the same as the Fortescue. These rocks lying directly in the track of ships bound into the English Channel, this information should be made as public as possible."

EXTRACT OF A LETTER FROM LIEUT. SPRIGG, COMMANDING H.M.S. BRISK, 1842.—"Sir,—I have the honour to add, that H.M. brig under my command, on the 6th of August, was distant from the Devil Rock, at noon, thirty-five miles, and, doubting its existence, I shaped a course directly for it. At 7 p.m., whilst looking over the taffrail, my attention was suddenly attracted by a change in the colour of the water under the ship's counter, which had been of a blackish green. On looking over the starboard quarter, the change to whitish green was more vivid, extending in a N.N.W. and S.S.E. direction for a mile and a half, its greatest width, close to our wake, about three-quarters of a mile, having very regular and indented sides, in bold outline with the dark water surrounding it. A heavy swell from the north-west seemed smoother over the patch, without any visible break; but that it was a shoal, no doubt exists on my mind, or on many that saw it. The mast-head man unfortunately did not report it, though he admits having seen it, three miles before reaching it, and about the same before he lost sight of it astern. From the deck, in about fifteen minutes it disappeared, preserving its shape and colour to the last.

"The sun was 6 or 8 degrees high at the time, the vessel going 8 knots; and as we had no more than four days' provisions on reduced allowance, I did not feel justified to return and sound, nor would I have attempted to pass over it in the brig. Its situation, by our reckoning, deduced from afternoon sights, by the sea, and the planet Jupiter, places the spot in latitude $46^{\circ} 12' N.$, longitude $15^{\circ} 3' 30'' W.$ "—*Nautical Magazine for 1842, page 793.*

7. SHOAL ON THE BANKS OF NEWFOUNDLAND.—A shoal with only 21 feet water upon it was discovered by Jesse Ryder, master of the fishing-schooner Bethel (belonging to Province Town, Massachusetts), on the Grand Bank of Newfoundland, in lat. $46^{\circ} 30' N.$, having observed on the shoal and saw distinctly, it being a rock of about 100 or 200 feet surface, supposes it to be about 50 miles east of the Virgin Rocks. Shoal bears from Nine-fathom Bank S. by W. by compass, about $1\frac{1}{4}$ mile: discovered it accidentally while searching for the Nine-fathom Bank, to fish on. Am certain it was not any part of the Virgins: for I afterwards saw them, and from my experience of the different fishing-grounds, know this shoal to exist.

This information I obtained from Mr. Ryder himself, and took a sketch from one that he had in the American Consul's Office, at this place. *Walter Douglas*, commander of the Unicorn Steam Packet, Halifax, Feb., 1845.*

* On the French charts of the banks, a shoal of 9 fathoms, seen by a Captain Bethel, in 1844, is

8. **VIRGIN ROCKS.**—We are happy in being enabled to state the result of the observations of Captain Bishop, of H.M.S. Manley, and Mr Rose, master of H.M.S. Tyne, then commanding the cutter Inspector, both of whom returned to St John's, on the 9th of July, 1829, after a second attempt (in which they were successful) to ascertain the actual situation of the Virgin Rocks:—The bank, on which the shoal is situated, extends E. by N., and W. by S., $4\frac{1}{2}$ miles, its broadest part $2\frac{1}{2}$ miles; the soundings are regular, from 28 to 30 fathoms, deepening suddenly on the outer edge to 39 and 42 fathoms; the rocks are in latitude $46^{\circ} 26' 38''$ N., longitude $50^{\circ} 56' 35''$ W., extending in an irregular chain S.W. by W. and N.E. by E., 800 yards, varying from 200 to 300 in breadth; the least depth of water is on a white rock, in $4\frac{1}{2}$ fathoms, with 5 to $6\frac{1}{2}$ fathoms all round it, the bottom distinctly visible. Towards the extremities of the shoal are several detached rocks, of from 7 to 9 fathoms, with deep water between, and a current setting over them, W.S.W., one mile an hour, with a confused heavy swell.

9. **MARINER'S ROCK.**—Extract of a letter from Mr. Swinton, master of the ship Mariner, from London to Miramichi, dated 11th of May, 1831:—

“At 9 a.m., on the 20th of April, we had a very narrow escape of being lost. The ship was laid to the wind, under a close reefed main-topsail and main-trysail, in a heavy gale from the westward, and a high sea, when we saw the sea breaking on something to leeward, not more than 50 or 60 yards from the ship, which we at first took for a vessel bottom upwards; but on nearing it, it could plainly be seen to be a large rock, about 60 feet in length, ragged at the top, and high at one end, with weeds growing on it. We set the fore-trysail, and just cleared it not more than thirty yards' distance. By the observation at noon, and longitude by chronometer, it lies in latitude $46^{\circ} 0'$ N., and longitude $29^{\circ} 37'$ W., not laid down in the chart, and I think will only be seen when there is a heavy sea running; but we could see it very plainly in the hollow of the sea. The south end appeared to be the highest part of it. Sights were obtained for the chronometer at half-past 9, and the meridian observation was very good.”

10. **INDEMNITY ROCK.**—“The ship Indemnity, at sea, at 3 p.m., discovered a rock on the starboard beam, distant about three ships' lengths; they were then going at the rate of about $2\frac{1}{2}$ miles an hour, with a heavy swell from the N.W.: with each succeeding swell, it was entirely covered, but at intervals it showed several feet above water, and perfectly perpendicular. From the mast-head, it was seen to a great depth below the water, and appeared to be in the shape of a cone. At the preceding noon, our latitude, by observation, was $43^{\circ} 20'$ N., and longitude, by chronometer, $25^{\circ} 10'$ W.” Signed, R. WOODALL, master; F. E. CHALMERS, mate.

11. **BEAUFORT BANK.**—Lieut. A. Sainthill, R. N., commander of the ship Beaufort, lately returned from Jamaica, informs us, that on the 3rd of August, 1832, when in latitude $42^{\circ} 37'$ N., and longitude $41^{\circ} 45'$ W., he observed the water to be discoloured; in consequence of which, he tried twice for soundings, and found rocky ground at the depth of 100 fathoms. Lieut. Sainthill is also of opinion, that soundings might be found from the meridian of 20° W. to the Banks of Newfoundland.

12. **THE AMPLIMONT ROCKS.**—Extract of a letter received from Captain Thomas Alderson, of the Morning Star:—“On the 13th of May, 1842, I sailed from Paimbœuf for Quebec, with the wind at N.E. We had a

stated to be in lat. $44^{\circ} 43'$ N., and long. $49^{\circ} 51'$ W., but the position is somewhat uncertain. The words Bertel and Bethel (the name of Mr Ryder's vessel) are not so unlike, but that they may have been confounded; in that case, the dangers may be the same, but they differ widely in latitude.

fine run to long. $19^{\circ} 44' W.$ On the 23rd of May (at noon, in lat. $42^{\circ} 31' N.$, by two good observations, and long. $24^{\circ} 3' W.$), at 7h. 20m. p.m., I passed a rock within two ships' length. When I first saw it, it was a little before the larboard beam, and appeared like a ship's anchor-buoy. When it came on the quarter, I saw the sea-weed quite plain upon it, as did also the watch on deck. Another part of the rock we saw under water, about 8 or 10 feet from the rock we saw above water; at intervals it was covered and uncovered. We had not much swell on at the time; fine pleasant weather. At the time of passing the rock, the ship was in lat. $42^{\circ} 51' N.$, and long. $24^{\circ} 15' W.$ The rock was seen a considerable time after we passed it. Wind at the time, W.N.W.; ship's head north, going 3 and $3\frac{1}{2}$ knots per hour."

In M. Bellin's Memoir, of 1742, a danger is mentioned in lat. $42^{\circ} 30' N.$, and long. $24^{\circ} 5' W.$, which was seen in 1735, by M. Guichardi, commander of the ship Dauphin, of Nantes. It has two points of rocks, separated, and 30 feet above water. He ascertained the height within a league of the danger, which appears to be the same as that named La Basse d'Amplimont, stated to be nearly in the same latitude and longitude. Some Englishman has called it by the name of Edmund Knowles' Rock, by whom it is supposed to have been seen.

These rocks, appearing like the two masts of a brig, and nearly in the position assigned, were seen by Captain Mills, in the brig Tamer, early in 1829.

13. DRUID'S REEF.—This reef was heretofore inserted from the late Spanish chart, as seen in 1803, lat. $41^{\circ} 24' N.$, and long. $41^{\circ} 20' W.$; but the authority under which it had been there introduced we cannot inform our readers. On the 12th of April, 1831, Captain Treadwell, in the Druid, of London, passed this reef on his starboard hand, at not more than 30 yards distant. The weather was calm, and he had taken a good meridian altitude; whence the latitude was assumed to be $41^{\circ} 19' N.$, and the longitude by chronometer, which has always proved correct, $41^{\circ} 35' W.$ The reef had the appearance of from seven to ten sugar-loaf heads, and its length from E.N.E. to W.S.W. was estimated at from 10 to 14 feet. It was about 3 feet above water.

14. HERVAGAUT'S BREAKERS.—On the 12th of May, 1827, Captain Maxwell of the ship Home, on his passage from Liverpool to New York, fell in with three sunken rocks, with a tremendous sea breaking on them, apparently from 4 to 6 feet under the surface, in lat. $41^{\circ} 2' N.$, and long. $49^{\circ} 23' W.$, and about 30 feet in circumference; the last of them tailed off to the N.E. with a long ledge. Winds, at the time, W.S.W.; ship's head N.W., going $7\frac{1}{2}$ knots per hour. Captain Maxwell says, "The chronometer I have with me can be depended upon to one mile, and the latitude and longitude I have given is correct." This shoal is the Hervagault's Breakers of the French charts. In 1816, it was seen by Captain Lourp, of the brig Alexander Savage, who places it in latitude $41^{\circ} 6' 23'' N.$, and longitude, by dead reckoning, $49^{\circ} 57' W.$

15. WATSON'S ROCK.—The particulars of this danger are thus communicated by Captain Watson:—"April 20th, 1824, at 8 a.m., being on the starboard tack, ship going $2\frac{1}{2}$ knots an hour, moderate weather, a man saw something a-head; the helm was immediately ordered a-weather to clear it, being very near it; ship was only 15 or 20 fathoms to leeward of it, which enabled me distinctly to make it out to be a rock, just even with the water. Its head was round, and appeared to be about three fathoms or more in diameter; it was of a light green, with some branches of a red colour. It was at times, on the top of a sea, invisible, but in the hollow of a sea, several

feet uncovered. From an excellent observation at noon, I consider it to lie in lat. $40^{\circ} 18' N.$, long. by dead reckoning, $53^{\circ} 40' W.$ "

It would appear from the following that there is a probability of a bank or rock in this locality. "On my passage from New Orleans to Liverpool, February 19th, 1849, the temperature of the water at 8h. a.m. was 66° ; at 10h. a.m. 63° ; at noon down to 60° ; at 1h. p.m. 61° ; at 2h. p.m. 63° ; and at 4h. p.m. 66° . This was in latitude, by observation, $40^{\circ} 5' N.$ and long. $53^{\circ} 45'$; but, as the weather was thick and squally, and a very heavy sea was running, we could not see more than 4 or 5 miles from the ship; but there was no danger in sight,—still I think there is a bank or rock not far from my position at noon. May not this be the Watson's Rock, which is generally considered to be doubtful? (Signed) *James Akett*, ship Corsair."

16. CASHE'S LEDGE.—This ledge lies in about lat. $42^{\circ} 56' N.$, and is situated on a bank of 20 to 40 fathoms water, the extent of which is not well ascertained. On the eastern side of this bank you will soon get into deep water, and there from 80 to 90 and 100 fathoms between it and the Fippenies Bank to the westward. What renders Cashe's Ledge so dangerous is a flat white rock, in extent about 300 feet, which is situated on the eastern edge of the bank, and has 26 feet, or less water, upon it. South of this rock there is said to be a gully of 90 fathoms water running in upon the bank in a south-westerly direction, upon the south side of which, at 3 miles to the southward of the flat white rock, there is a shoal of 7 fathoms, having immediately around it soundings shoaling suddenly from 15 to 30 fathoms on all sides except the east, when it deepens suddenly to 80 and 90 fathoms.

At about 9 or 10 miles to the N. by W. of the flat white rock, and separated from it by soundings of 10 to 35 fathoms, rocky bottom, there is a shoal of 11 to 14 fathoms, bottom of kelp.

Cashe's Ledge has been described by several navigators; but, until sought for by Commander Davis, of the U.S. Navy (a copy of whose report is given subsequently), its position was not very accurately ascertained. Commander Owen, R.N., a few years since, ran a line of soundings of 40 to 45 fathoms across the bank, in a north-westerly direction, but was unsuccessful in finding the 26 feet rock, although we believe his search was repeated several times.

The following description of Cashe's Ledge, by the Master of H.M.S. Beaver, was written some years since:—"I took my departure from Thatcher's Island to the eastward of Cape Anne. The island bore North from me, distant 3 miles. From this bearing I steered E. $\frac{1}{4}$ N., with a fair wind, 65 miles, and fell in with the bank where Cashe's Ledge is, about 2 leagues to the northward of the shoal, in 60 fathoms water, hard black clay. This bank extends from North to South 7 leagues, and from East to West 2 leagues. In the middle of the bank is the shoal mentioned: its length and breadth is about half a mile. It is rocky, and its soundings very irregular, having from 10 to 4 fathoms in the length of a boat. You will have 17 fathoms of water within a cable's length of it, deepening as you stand from it, to 90 fathoms. As you approach the bank, you sound in from 60 to 35 fathoms, brown sand, with black stones and broken shells; then in 30 fathoms, it grows rocky. The current on the ledge is extremely rapid and unaccountable. If the wind blows strongly, any vessel would founder, although she should not strike on it. The situation of the ledge, by four days' good observation, is lat. $43^{\circ} 1' N.$, long. $69^{\circ} 6' W.$ As this is a very dangerous shoal, all ships should endeavour to keep clear of it. On the shoalest parts are only 12 feet at low water."

It has since been said by Mr Backhouse, H.M.S. Argonaut, that this ledge

extends north and south 7 leagues; the shoalest part being near the centre of the bank, extending a quarter of a mile each way. The ledge, he observes, bears from Cape Anne E. $\frac{1}{4}$ N., 24 leagues, the shoalest part being in the latitude above mentioned. "You will have," he adds, "on this part from 10 to 4 fathoms, very irregular soundings, all rocky bottom. The current shifts all round the compass every hour, and runs at the rate of 2 miles an hour."

Commander Charles H. Davis, Superintendent of the United States' Survey, makes the following report relating to the position of the rock at Cashe's Ledge, dated June 8th, 1849: hence we may consider that the locality is now fully determined:—

"The U.S. steamer Bibb remained at anchor on the rock from 5 o'clock on Tuesday to 5 o'clock on Wednesday afternoon, during which time the boats were employed in repeated examinations of the surface of the rock. The sea was smooth, the wind west, the weather perfectly clear, and the southern and western horizons well defined.

The latitude was determined—

1.—By the meridian altitude of the moon with three observers, whose readings differed from each other less than half a minute. The meridian passage occurred at twelve minutes past midnight; the declination of the moon was $17\frac{1}{4}^{\circ}$ south, which, the night being remarkably cloudless, secured a distant horizon.

2.—By a meridian observation of the sun, with four sextants, the readings in which differed in the extreme but one minute. The latitudes given by the sun and moon differ from each other but one mile. The longitude was determined by three chronometers, from Messrs. Bond and Son, which were taken on board on Monday, and returned on Thursday; and were proved by the final comparisons of Thursday to have run correctly. Twenty-five observations, taken on the 5th and 6th, were used to ascertain this element, the mean of those of the 5th differing from that of the 6th only by a second of time. Several sets, not employed in obtaining the reported result, were also taken for confirmation. Not being absolutely required, they were worked out with less care,

The latitude of the rock, by the meridian observation

of the sun, is..... $42^{\circ} 56' N.$

The longitude, the mean of both days, is $68^{\circ} 51\frac{1}{4}' W.$

The latitude and longitude of this rock, recently given by the best authorities, are $42^{\circ} 44'$ and $69^{\circ} 3'$, the former differing 12 miles, and the latter 12 miles from the Coast Survey determination. Formerly the latitude and longitude of this spot were laid down as $43^{\circ} 4'$ and $69^{\circ} 11'$, the former 8 and the latter 20 miles in error. These errors, particularly in latitude, give additional value to our determination, and render its early announcement important to navigators. The least water on this rock is 26 feet; a less depth has been reported by the fishermen, but they sound with their fishing lines, not accurately marked, and having on them a lead of $3\frac{1}{2}$ pounds only, not heavy enough to press down or pass through the thick kelp that covers the rock. The extent of rock, having 10 or less fathoms on it, is about half a mile in a N.W. by W. and S.E. by E. direction, and very narrow. It is surrounded by deep water at a short distance, particularly on the south-east side, where the depth increases suddenly to 60 fathoms.

It is my wish that this should be named Ammen's Rock, in compliment to the officer by whose exertions, last summer, the means were afforded of discovering and correctly determining its position at this time."

17. JEFFERY'S BANK.—This is an extensive deep-water bank, of 30,

40, 50, and 60 fathoms, 16 leagues in length N.E. and S.W., and 3 leagues in breadth; it is generally represented in the charts as commencing close to the southward of Mount Desert Rock, and extending to about the longitude of $68^{\circ} 45'$ West. Outside of the bank the water deepens to 70 and 80 fathoms, and between it and the shores of America are 100, 70, 60, and 55 fathoms; on or about it there is no danger whatever.

18. ST. GEORGE'S BANK.—This bank was regularly surveyed in 1821, by the United States' schooner *Science*, and the sloop *Orbit*, under the orders of Captain Isaac Hall. The following is a copy of his report;—
“There are properly four shoals on St. George's Bank; the whole of them are included between the latitudes of $41^{\circ} 34'$ N. and $41^{\circ} 53' 30''$ N., and longitudes $67^{\circ} 18'$ W. and $67^{\circ} 59'$ W. Between them are from 15 to 35 fathoms of water.

“The largest, and on which is the greatest danger, is the most southerly and westerly. It is somewhat triangular, with a long and narrow spit running out from the S.E. angle. The S.E. point is in latitude $41^{\circ} 34'$ N., and longitude $67^{\circ} 40'$ W. The west point is in $41^{\circ} 42'$ N., and longitude $67^{\circ} 59'$ W. The N.E. point is in latitude $41^{\circ} 48'$ N., and longitude $67^{\circ} 47'$ W. The eastern side of the shoal, although somewhat irregular, runs nearly S.S.E. and N.N.W., having on it from 3 feet to 9 fathoms, at common low water; it is composed of a great number of sand-spits, very narrow, so that the width of a narrow vessel will make several fathoms difference in the depth of water. The general range of the spits is from S.E. to N.W. As there are no rocks, they are, consequently, liable to change, in some measure, their position and ranges. On their eastern edge, even in calm weather, unless it be either high or low water, the tides run with great rapidity, and form considerable breakers, when setting to the westward. This is accounted for by a knowledge of the fact, that directly on the edge of this shoal, there are from 12 to 16 fathoms of water, so that the edge forms a sort of dam, stopping the force of the flood-tide, and over which the ebb falls down.

“When there was any considerable wind, we observed that the breakers were higher within the edge to the westward than on the edge; and I have no doubt that the water there was still shoaler, and that we should have seen the sand had it not have been for the heavy sea. The breakers were such, unless it were entirely calm, that it was impossible to go among them with boats; nor was it considered safe to attempt with vessels. For besides the dangers of striking on the hard sand-spits, the vessels would have been liable to have been filled by the breakers. Even on the eastern edge, and at nearly slack water, the vessels were, at times, nearly covered with them. It was, therefore, not thought necessary to attempt it, as the object of the survey—to ascertain if there was danger on the shoals, and the situation and extent of this danger—could be accomplished without the risk. Had not the sea been very smooth, and at high water, we should not have been able to have got on where we found only 3 feet, when reduced to low water. The prevailing wind was to the eastward; and I have no doubt that this place would have been bare, with any continuance of an off-shore wind. I think there are no rocks about the shoals. We had one cast on the S.W. side, which indicated rocky bottom, in 15 fathoms; but I believe it to have been some sharp stone that the lead struck upon.

“The centre of the northern shoal is in latitude $41^{\circ} 53' 30''$ N., and longitude $67^{\circ} 43'$ W. It extends east and west, about 4 miles; the shoalest part, having 6 fathoms, is very narrow, and composed of hard sand; but there are not more than 12 fathoms of water for 3 miles to the southward of the above latitude. On the north side, at two cables' length from the shoal, the shoal

dropped into 33 fathoms. The breakers on this shoal are very heavy, and when there should be a sufficient sea to endanger a vessel, they might be seen some miles, and heard at a considerable distance; and as the shoalest part is not more than a cable's length inside, and no danger near it, a vessel might avoid it.

"To the eastward of the last-mentioned shoal, in latitude $41^{\circ} 51'$ N., and longitude $67^{\circ} 26'$ W., is another small shoal, with 8 fathoms water, having, however, considerable breakers. There are but 17 fathoms for 3 miles to the northward of it; but very near to the eastward are 31 fathoms, and from 20 to 30 fathoms to the south and west.

"The centre of the east shoal is in latitude $41^{\circ} 47'$ N., and longitude $67^{\circ} 19'$ W. It is about two miles long from east to west, and has 7 fathoms water. To the southward there are but 17 fathoms for two miles; but in other directions there are from 20 to 30 fathoms.

"The above shoals, I am confident, are all which are on St. George's Bank; their positions and sizes may be relied on, as well as the soundings which I have laid down. They were ascertained by a vast number of celestial observations, taken with good and well-adjusted instruments, on board the two vessels, and very carefully calculated. The rates of the chronometers were found by a transit instrument, previously to sailing from Boston, and after our return, and all our observations re-calculated for the small variation that appeared.

"At anchor, in different places, and on different days, we determined the set and strength of the tides, and, as nearly as possible, their rise and fall. The rise of them is from 1 to $1\frac{1}{2}$ fathom. They set round the compass every tide, setting S.E. every full moon, and running from 1 to 4 knots per hour, at a mile's distance from the breakers. The mean rate, is however, materially varied by the winds. They set strongest at W.S.W. and E.N.E., and which is, undoubtedly, the strength of the flood and ebb. From these causes and variety in the tides, arises a principal danger in approaching the shoals. When under-way about the shoals, in a few hours' time, we found ourselves drifted far out of our reckonings; and to ascertain our situations, when both vessels were under-way, we took continued observations for the longitude by the chronometers, and, at the same time, double altitudes for the latitudes; which latter were calculated by Brosius's new and certain method. By allowing for the set of tides, as ascertained at anchor, the observations and reckonings agreed very nearly, so that the latitudes and longitudes of every place may be considered as certain. Should, therefore, any vessel fall in with these shoals, a knowledge of the course and strength of the tides will prove of the greatest importance; and they can, by the preceding facts, be calculated for any day and hour.

In proceeding from Cape Cod to the shoals, at 5 leagues from the light, there are 86 fathoms, muddy bottom. The water gradually deepens to 133 fathoms, and then decreases towards the shoals. In latitude $41^{\circ} 51'$ N., and longitude $68^{\circ} 11'$ W., there are 90 fathoms; in latitude $41^{\circ} 50'$, and longitude $68^{\circ} 3'$, there are 49 fathoms, sand and gravel, on the western edge of the bank; the water then shoalens fast; to the northward of the shoal, in latitude $41^{\circ} 59'$ N., and longitude $67^{\circ} 52'$ W., on the south side of the north channel, there are 60 fathoms, soft mud; in latitude $42^{\circ} 12'$ N., and longitude $67^{\circ} 51'$ W., there are 102 fathoms; in latitude $42^{\circ} 10'$ N., and longitude $67^{\circ} 18'$ W., there is no ground at 175 fathoms. To the eastward we did not ascertain the extent of the bank. At two miles southward of the S.E. point of the shoals, there are from 20 to 26 fathoms, which soundings continue 20 miles to the southward and westward. The bottom on the bank, so far as we

examined it, is of such a narrow character, that it is difficult for a vessel to ascertain her situation by it; we often found a great variety of soundings in a very short distance, such as sands of various colours and differently mixed, coarse and fine gravel, pebbles of various colours, stones, sponge, and shells.

Notwithstanding this variety, some general character of the soundings may be useful. The mariner, therefore, will find to the westward of the shoals, and at some distance from them, the bottom to be coarse sand and gravel of all colours; to the N.W., a mixture of white, black, and yellow sand; to the north, black and white sand; to the N.E., chiefly gravel and pebbles; to the east, fine white and yellow sand; and in latitude $41^{\circ} 57' N.$, and longitude $66^{\circ} 40' W.$, some white moss; to the S.E., fine white and yellow sand; and to the south, generally white sand. As the shoals are approached, in whatever direction, the soundings become coarse, and are frequently mixed with shells of different kinds. Near the shoal much of the bottom is pebbles; and to the east of the largest and most dangerous shoal, there are stones the size of hens' eggs, with moss and sponge on some of them.

Near the S.E. point are from 15 to 20 fathoms; a prevailing character of the soundings is green shells, chiefly of the species called sea-eggs. If a vessel be far enough south to avoid danger, she will have no shells. The reports that rocks have been discovered on these shoals are undoubtedly incorrect: at the western part of the bank we saw, in strong tide rips, large quantities of kelp and sea-weeds, which, at a distance, had the appearance of rocks, but on sounding we found good water and a regular and clear bottom.

It will be seen, by the bottom, that the holding-ground is not good; but the vessels employed in the survey, by having a long scope of cable, frequently rode out a considerable gale of wind, for 22 hours, on the east side of the main shoal, and also to the windward of it; the sea breaking very high at the time, we being in 10 fathoms water. It may be worthy of remark that, at one cast of the lead, on examining the arming, I found one-third black sand, one-third white sand, and one-third green shells, in as distinct dimensions as they could be drawn."

This bank was again surveyed in 1837, by Com. Charles Wilkes, of the U.S. Navy, and from his report it would appear that the two shoalest spots are in lat. $41^{\circ} 40' 13'' N.$, long. $67^{\circ} 44' 10'' W.$, and lat. $41^{\circ} 40' 33'' N.$, long. $67^{\circ} 44' 30'' W.$, and that these consist of knolls of hard sand, having on them at low water only $2\frac{1}{2}$ fathoms, or 15 feet. Mr. Wilkes says, in his report, that "the whole of the shoal is composed of hard sand-spits—fine sand on the shoalest places, and coarser as the water deepens, until it becomes large pebbles without sand.

"The rise and fall of tides is 7 feet, extremely regular, the first part of the flood setting N.N.W., the latter part N. by E., and the ebb S.S.E. and S. by W. The flood runs $4\frac{1}{2}$ hours, ebb $5\frac{1}{2}$ hours; greatest velocity $2\frac{1}{2}$ to 3 miles of a mile, from half an hour to 2 hours in changing, going round with the sun or from north by way of east. The wind has but little effect on the velocity. High water, full and change, at 10h. 30m. Variation of the compass $8^{\circ} 15' W.$

From this survey it would appear that the shoal is about 14 miles long and $1\frac{1}{2}$ to 2 miles broad, the soundings being generally from 6 to 8' and 10 fathoms. As noticed above, the sea sometimes breaks heavily on it.

The *Little George's Bank*, having only 5 fathoms, and which breaks in heavy weather, is in lat. $41^{\circ} 11' N.$, and about longitude $68^{\circ} W.$, being about S.W. by S. from the great shoal of George's Bank. The fishermen have given it the above name.

A bank, named upon the chart "*Clark's Bank*," has been discovered a little to the westward of George's Shoal, and 10 to 20 fathoms water have been found upon it; this is said to be in latitude $41^{\circ} 34'$ N., longitude $69^{\circ} 15'$ W.

In coming from the southward for George's Bank, you will get soundings in latitude $40^{\circ} 4'$ N., if on the S.S.W. part of the bank. Should you not get soundings in latitude $40^{\circ} 30'$ N., you may be certain you are to the eastward of the shoal, when you must direct your course accordingly to clear it; when your first soundings will be in 75 to 60 fathoms. When steering to the northward, you will shoal your water gradually to 20 fathoms, when you will be in latitude $41^{\circ} 20'$ N., which depth of water you will have 10 or 12 leagues distant, either eastward or westward.

19. BRETON'S ROCK.—This shoal was seen by Breton, a pilot, of Rochelle; and again was seen in 1816, by the ship *Tiger*, on her passage from Barbadoes to Liverpool. It is thus described by a passenger:—"On the 14th of March, at 10 a.m., a smart breeze from S.W., with studding-sails set, going $7\frac{1}{2}$ knots an hour, steering E. by N., *true*, in lat. $39^{\circ} 40'$ N., and long. $41^{\circ} 40'$ W., we passed over a very agitated rumbling sea. Under our starboard bow, in appearance about a circle of a mile, was a small field of dark brown rock-weed, apparently a confirmed fixture; entangled with the weed were two pieces of spar, seemingly very much decayed. I am positive that this is a danger which ought to be carefully avoided by all ships coming to Europe from the West Indies and America, as it lies directly in the track."

20. HILTON ROCKS.—The following was communicated to the *Nautical Magazine*, 1845, by Mr. Livingston, of Liverpool:—

"Barque Secret, from Valparaiso to Liverpool, 12th May, 1845.—While observing a meridian altitude breakers were reported; they were of no great extent, but Mr. H. plainly saw some objects in the hollows of the waves, which he felt certain were heads of rocks. The swell was very heavy, and he thinks in smooth water they would be nearly on a level with the surface of the sea. The breakers were about $1\frac{1}{2}$ or 2 miles S.W. (by compass) from the vessel, and at the time she was running $7\frac{1}{2}$ or 8 knots, with steering sails set, so there was not much time for very particular remarks.

"The latitude stated $39^{\circ} 18'$ N., and long. $35^{\circ} 50'$ W., was from meridian observations, and the longitude from the mean of these observations, viz.: their own chronometers, the chronometer of a ship in company, and a lunar taken by Mr H. himself, the same afternoon."

21. HUME'S REEF.—This danger was first made known by Mr Alexander Munn, of the brig *Joseph Hume*, on a voyage from Mobile to Liverpool, the purport of whose communication is as follows:—On the 22nd of August, 1827, they discovered a sand-bank in latitude 39° N., and longitude $64^{\circ} 20'$ W.; they passed close-to, saw the white sand above the water, and sounding where the vessel then was, found 20 fathoms, sandy bottom, a quarter of a mile off. The mate requested permission of the master to go for a few buckets of sand, but he would not grant it. The bank was observed from the mast-head to be of a horse-shoe form; the opening facing the S.W., and appeared in length to be not more than half or three-quarters of a mile. Mr Munn farther stated, that they were obliged to bear up and sail to the westward of it, in deep water, and supposed it to be on the eastern edge of the Gulf Stream. The longitude here given cannot be supposed to be altogether correct, as it was not determined by chronometer or lunar observation, but was calculated back from the day on which they sounded on the eastern edge of the Great Bank of Newfoundland.

22. PRONK ROCKS.—The following has been communicated to the

Nautical Magazine, by Captain Foxhens, of the Dutch ship Rhoon and Pendrecht:—

“ Captain a Pronk, of the Dutch barque De Hoop, reports that on his passage from Batavia to Rotterdam, in the North Atlantic Ocean, near the Azores, April 6th, 1844, in the afternoon, sailing with a strong breeze and fine weather, being on the quarter-deck with his officers, they were much alarmed by some of his people in the foretop, calling out that they saw a large rock close by on the lee-bow. The captain immediately ordered the helm to be put down, and the vessel luffed up three or four points, to avoid the danger; with astonishment they saw several rocks plainly visible from deck to every man on board. They passed them within a cable's length, and Captain Pronk says, that it was an extensive group of rocks, with several points above water, some of them more than 16 feet in height, against which the sea broke furiously. The captain places this danger in lat. $38^{\circ} 32' N.$, and long. $33^{\circ} 16' W.$ by very good observations and chronometer; the next day they saw the Western Islands, and found the longitude by chronometer very exact.”

This may probably owe its existence to recent volcanic action; that it has existence we have no doubt, as dangers have before been reported in this neighbourhood.

23. PRINCESS ELIZABETH SHOAL.—EXTRACT OF A LETTER FROM LIEUT. SCOTT, COMMANDING THE PRINCESS ELIZABETH PACKET:—“ On the 24th of April, 1828, at three o'clock, p.m., I came on deck, and immediately observed the water round the ship very green, and with every appearance of being in soundings; and, on looking before the starboard beam, saw under water, at the distance of about two cables, what evidently appeared, to the master and myself, to be a white sand-bank or rock, which the water did not then break on, but it appeared so very plain, that there could not be much water on it. In extent it was about one, or one and a half cable, E. by N., and W. by S. (true bearings), and about half a cable in breadth. Immediately on observing the shoal, I ordered the lead and line up, but, ere it was ready, the colour of the water had changed to a deep sea-blue, when it was evidently no use to sound: at that time we were about a mile from the white spot; we had at the time a good breeze, but very little swell of the sea for the Atlantic Ocean. I obtained two sets of lunar distances the day before; and at noon, on the 23rd, had taken myself, with a sextant, the meridian altitude very particularly, in order to obtain the time correctly for lunar distances, on the opposite side to those taken on the 23rd; and which I did obtain, and made the latitude of the shoal $38^{\circ} 16' N.$, and by the mean of the lunars, which differed very little, in longitude $39^{\circ} 48' 49'' W.$ Owing to a defect in my chronometer, I was not enabled to bring forward the longitude by it, but every care and attention in my power has been taken to give its correct situation.”—*Nautical Magazine*, 1832, page 12.

24. ROCKS NEAR THE AZORES.—Copied from the *Nautical Magazine* for 1840, page 881. “ J. Manvel Marriano Ferreira, pilot, while navigating from Paraiba to Lisbon, on board the Brazilian brig *Constante*, as master and chief pilot thereof, and being to the westward of the Azores, near the parallel, and not very distant from the meridian of some sunken rocks, marked in the chart as doubtful,—at 10 a.m., on the 26th of August, 1840, sailing in a northerly direction, with light winds from the E.S.E., saw breakers to windward, at the distance of one or two miles. Shortly after, it fell calm, and my vessel remained in the same position for six hours, and in sight of the said breakers, so that I got the boats out, to keep her head away and tow her out of danger. At noon, it being then high water at that place,

the surf had nearly disappeared; at 2 p.m. it again became perceptible; and at 6 p.m., a group of rocks was clearly visible above the water. By the latitude I had observed at noon, and the longitude given by a good chronometer, and the rocks being about a mile and a half distant from me, I compute their situation to be in north latitude $37^{\circ} 56' 20''$, and west longitude $33^{\circ} 4' 8''$, from Greenwich. As the wind freshened, at 6 p.m. I made sail again, and having arrived in three days in sight of the island of Flores, I found that my chronometer was perfectly correct. The wind being east, I tacked to the southward; and, on the 31st of August, I passed near another sunken rock, which is marked in the chart as having been seen by Capt. Robson, to the westward of Fayal. At 8 a.m., I saw some rocks above water, over which the sea broke, and which I passed to leeward, at the distance of one or two miles. By observation, and the chronometer, I calculate this second danger to be situated in north latitude $38^{\circ} 26' 44''$, and longitude west of Greenwich $30^{\circ} 25' 10''$, all which I certify without any doubt.—*Lisbon, 6th October, 1840.*"

The following bank is reported to exist near the Azores:—

A bank is said to have been discovered to the northward of the Azores, on the 27th of October, 1850, by Captain Henderson of the *Chaucer*, belonging to Glasgow, who reported that "at noon, in lat. $42^{\circ} 41' N.$, long. $28^{\circ} 45' 30'' W.$, the sea being much agitated and the water discoloured, at 2 o'clock p.m., tried the soundings, and got bottom at 48 fathoms. The ship having gone 8 miles N. by W., at 4 o'clock p.m. sounded, and found ground at 50 fathoms, hard rocky bottom, in, by sights taken, lat. $43^{\circ} 49' N.$, long. $29^{\circ} 4' 15'' W.$ This rocky bank must extend from the southward, as the water was observed to be discoloured at 10 o'clock a.m., and appeared as if a current was setting over it."

In a subsequent communication to the *Nautical Magazine*, Captain Henderson stated, that "the soundings I reported were accurately taken may be relied on, as I have had much practice, and as to their positions I can only say that they were as carefully found as my means could afford.

During my passage from Fort Louis to St. Helena, I had frequent opportunities of finding the longitude by lunar observation, and found fair agreement between the results and the longitude per chronometer, and both at St. Helena and at Ascension, found that the chronometer had kept to the rate. On the 23rd October, I made Fayal, when, having good observations, I found the rate unaltered.

On the 28th October, at noon, we were in lat $42^{\circ} 41' N.$, and long. $28^{\circ} 45' W.$, steering N.W. by W. (true), with light variable winds from the eastward and fine clear weather. Having previously observed that the water had changed colour about 10 a.m., and since that there was a sensible ripple, at 2 p.m. I sounded, and found hard bottom at 48 fathoms: the distance run since noon about 6 miles.

At 4 p.m., having steered same course in lat. $42^{\circ} 49' N.$ and long. $29^{\circ} 4'$ sounded, and found 50 fathoms; and, at 6 p.m., having steered same course and run about 6 miles found 70 fathoms, rocky bottom.

From observing the change of colour and ripple at the surface of the water at 10, a.m., and having sailed from that time up to 6 p.m., nearly north-west, the bank may probably extend considerably to the south-east of the position where I took my first sounding at 2 p.m."

25. TULLOCK ROCKS.—Captain Henderson, of the *Fortescue*, from Mauritius to London, gives the following particulars of these rocks;—"On the 17th of April, 1829, being in the exact parallel of the Tulloch Rocks, then in sight of the islands of St. Michael and St. Mary, the wind fair and

weather clear, I shaped a direct course for them, in order to convince myself of their existence. At noon, observed the latitude by meridian altitude $37^{\circ} 27' N.$, at the same time, the man who was placed at the fore-topmast head, looking out, gave notice on seeing breakers ahead. I stood on till I saw them myself, when I observed breakers in one bearing from the ship W.S.W., the former about 4 leagues, the latter nearly 2 miles: there appeared to be several heads near the surface of the water. The wind being westerly, and heavy ground swell (having a fair wind), was the only cause of my not sounding. The mean longitude that day, by moon and star Antares, and a well regulated chronometer, proved at St. Helena and Ascension, was $24^{\circ} 3' W.$, amplitude, p.m., $24^{\circ} 10' W.$, heavy swell, and the compass very unsteady."

In the *Nautical Magazine* for 1832, page 170, is the following:—"We have before us the copy of a letter of Captain Henderson, commanding the ship Fortescue, who states, that he saw the Tulloch Rocks on the 17th of April, 1829, in about the same position as before reported, but, unfortunately, he did not try for soundings. On the application of the Trinity-house, H.M.S. Ariadne, commanded by Captain F. Marryat, was sent in search of these rocks, in the summer of the same year; but, after taking her departure from the Formigas, and steering a course which would have carried her upon them, had they existed in their reported situation, nothing was seen of them. The boats of the Ariadne were also sent in search of them, in charge of the proper officers, and although the weather was fine, and every thing favourable to their discovery, they could not be found. We are, therefore, compelled to let the Tulloch Rocks remain on the list of reported vigias; and the recent loss of the Zillah in that neighbourhood, stated in our Miscellany, is a sufficient caution to navigators to beware of undiscovered dangers near the Formigas."

The Tulloch Reef has probably submerged, as Capt. Wilkes, who was sent out by the United States' Government, in 1838, to explore hidden dangers in the Atlantic, searched for it without success. He says:—"On the night of the 13th September, we laid by, just after passing the north end of St. Michaels, in order to examine the position of the Tulloch Reef by daylight. We passed within a mile and a half of its reported position, but saw nothing of it, although the sea was running sufficiently high to have made a heavy break on it, if it did exist."

To this we may add the following by Captain Vidal, who says:—

"So soon as the survey of the Formigas and the whole bank on which they stand had been completed, our attention was directed to this reported danger.

Captain Tulloch of the Equator, and Mr Ferguson of the Ayrshire, both state the reef to bear E.N.E. by compass from the Formigas, and 9 to 10 miles distant. Captain Henderson of the Fortescue, says the greater Formiga and the reef were in one bearing, W.S.W., by compass, the former 4 leagues, the latter 2 miles. The shoal 10 miles, E.N.E., by compass, from the Formigas. The search was, therefore, commenced on that line of bearing, and starting from the Formigas, was carried out under steam $14\frac{1}{2}$ miles, until they were lost sight of. The vessel, on an average, was stopped at every mile and a quarter, and soundings tried for with 200 fathoms of line. There were look-outs at the mast-heads and on the paddle-boxes, the former about 90, the latter 27 feet above the sea. She then returned to the Formigas, traversing across the line of bearing previously carried out, making trials for soundings as before, but no soundings were obtained, nor was there any indication of shoal water.

On the 20th of August the assigned position of the danger was again passed over, with look-outs as before, but without using the lead. On the 25th, the space was for the third time traversed, on lines not previously described by the vessel, and extended to the distance of 21 miles to the E.N.E. of the Formigas, the lead kept going at intervals to the depth of 320 fathoms.

Finally on the 29th of August another traverse was made across the E.N.E. bearing to a distance of 12 miles from the Formigas, cutting in between the previous tracks and trying for soundings, but limiting the lines to 200 fathoms. There was not throughout this search the slightest indication of a shoal.

We must express our opinion upon this reputed danger, as formerly upon the apparently well authenticated statements relative to the Aitkin's Rock. It looks very like a whale, but seeing the great difficulty there is in discovering small rocks beneath the surface of the ocean, we by no means presume to assert that Tulloch's Reef does not exist, but we entertain a very decided opinion that it will not be found in the position which has been assigned to it."

26. **DÆDALUS ROCK.**—The existence of this rock was confirmed on the 6th of March, 1839, by Mr. John Aves, commander of the *Tantivy*, of Plymouth. At 9h. 30m. p.m., this vessel, on her voyage from Zante, passed close to the eastward of it; it was not seen till close aboard, and not avoided without difficulty. There was a swell from the N.W. breaking over it, and a sheet of foam, about 20 to 25 fathoms in circumference. The *Tantivy* stood in N.N.E. on the starboard tack, till 7 next morning, then tacked to the southward, passing the cape at a distance of about 2 miles. The rock was thus estimated to lie considerably to the eastward of its position as shown by the chart, and to bear about S.S.W. true 37 or 40 miles from the cape.

27. **ORION ROCK.**—"We have received the following communication from Liverpool. The master of the *Orion*, belonging to our port, Luytjas, from Trinidad de Cuba, arrived in the *Weser*, has furnished the following particulars of a rock fallen in with:—On my voyage from Trinidad de Cuba from Bremen, we perceived, May 5th. lat. $34^{\circ} 51' N.$, long. $72^{\circ} 28' W.$, a rock about 2 feet above water. It had the appearance of a water cask of two or three hogsheads. We were at a distance of only 20 feet from the rock, when we fortunately in time discovered it. On none of my sea charts (and I had several of the most recent on board), was this rock to be found. Bremen, July 17th, 1845."—*Nautical Magazine*, 1845.

28. **THE EIGHT STONES.**—Extract from the *Nautical Magazine* for 1837, page 456. According to M. D. Apres, these rocks were discovered by Captain Vobonne, of London, in 1732; and by a vessel of Bordeaux, going to the West Indies. Captain Vobonne counted eight rocks even with the surface of the water. He placed the southernmost of them in $34^{\circ} 30'$, and the northernmost in $34^{\circ} 45' N.$ latitude; he gives them 3 leagues in extent from east to west, adds, that the southernmost rock is 40 leagues N., $5^{\circ} E.$, true, from the east end of Madeira. M. Fleurien, having considered that Captain Vobonne must have ascertained the latitude of this danger, either by an actual observation when in sight of it, or else by dead-reckoning, calculating his distance run from it to the east point of Madeira, concludes, that in the latter case, if the east point of Madeira were not laid down upon the charts, then, existing as it is now, the position ascribed to this danger by Captain Vobonne, must partake of the error. Now, the English and Dutch charts, of that time, lay down the east end of Madeira in $32^{\circ} 30' N.$ lat. only; and in

an old English chart this danger is laid down agreeably to Captain Vobonne's description, and on that chart the east end of Madeira is placed in $32^{\circ} 30'$. In our chart, the reef appears extending from $34^{\circ} 40' N.$ to $34^{\circ} 50' N.$, in longitude $16^{\circ} 35' W.$ If, however, Captain Vobonne determined its latitude by observation, then its position, as given by him, will be correct. We have adopted the idea, that Captain Vobonne ascertained its position by dead-reckoning, and have therefore placed on the chart, according to the corrected latitude and longitude, and of course rather more to the northward than Captain Vobonne, although nearer to Madeira than he stated it to be.

Messrs. Verdun, Borda, and Pingré, observe, how surprising it is that a danger of such large extent should not have been discovered before the year 1732, and that it should not have been often seen since, so much frequented as these latitudes are. It is, however, inserted on the chart, without pretending to vouch for its existence. In 1826, it was vaguely reported at Madeira, that the Eight Stones had been lately seen."

Such is the account of the Eight Stones, and it would appear that the vague report alluded to, of the shoal having been seen in 1826, may have originated in the following circumstance, which we find mentioned in the remarks of Lieut. W. P. Croke, commanding the *Emulous Packet*, in 1828:—

"The boatswain's mate, of H.M.P.-*Emulous*, under my command, William Ward, who is a steady good man, and worthy of credit, states that when serving in the merchant-ship *Nautilus*, of London, commanded by a Mr George Hall, a Lieutenant, R.N., they fell in with a shoal, as he thinks, about 30 leagues to the N.W. of Porto Santo; that a boat was lowered, and he, the said William Ward, went with Mr Hall, and plainly perceived breakers, weeds, and the rocks; that the weather was fine, and that he heard his commander and the mate say, that 'these rocks must be the Eight Stones.' W. Ward does not know the latitude or longitude, but says that both were well known to Mr Hall, and that chronometers and lunar observations were constantly used."

Lieut. Croke also adds, "I beg further to state, that during the last voyage, on the 28th January, 1828, I passed over the spot where the Eight Stones are laid down in the Admiralty charts, and consequently they do not exist there. It was a fine day, and I had three good chronometers, which, on making Porto Santo, the next day, perfectly agreed."

The remarks of Captain Beechy, relative to the Eight Stones, published in his account of the *Blossom's* voyage to Bhering Strait, and we may add those of other officers generally, are so much to the effect that the rocks have no existence, that we may save the reader a repetition of them.

29. **ASHTON ROCK**—Captain Guy, of the ship *William Ashton*, discovered this danger, on the 22nd May, 1824. "About 12 o'clock, the man at the wheel saw something on the starboard bow, distant about 1 mile, which shortly proved to be a rock, having hauled the ship towards it, and passed to the westward of it, about two cables' length. It was about 8 feet above water, and its base appeared about 100 yards in circumference, on which the sea broke. By a good observation, the latitude was $33^{\circ} 48' 50'' N.$, longitude, inferred from lunars the day before, $71^{\circ} 41' 20'' W.$

30. **DYET ROCKS**.—"On my passage from St. Kitt's to London, and when off Bermuda, May 17th, 8h. a.m., we passed within 30 or 40 feet of two sunken rocks, having 6 or 8 feet over them, it being very smooth at the time, in lat. $32^{\circ} 46' N.$, at noon. long. $59 W.$, by a good chronometer, and by several lunar observations previously. I strongly suspect they are the rocks marked as doubtful in lat. $32^{\circ} 30' N.$, long. $59 W.$ "—Robert Dyet, master of the barque *Catherine Greeme*.

31. **ROCKS EASTWARD OF BERMUDAS.**—Some rocks have been laid down on old charts of the Atlantic, at about 100 leagues to the eastward of the Bermudas, but their existence is very questionable, though subsequently represented to have been seen by Captain Bell, of the Francis Freeling Packet, who placed them in lat. $33^{\circ} 45' N.$, and long. $55^{\circ} 25' W.$, yet Captain Hurd, who surveyed the Bermudas, did not believe any danger to exist in the position assigned, but supposed that the person, upon whose authority they appeared on the chart, had advanced, by error, too near the reefs to the eastward, or north-eastward, of the Bermudas, and so mistook them for rocks at a much greater distance from land.

32. **JOSYNA ROCKS.**—The Penningham, Captain Purchase, from Laguna, at Liverpool, reports, on the 19th of February, on the passage out to Verra Cruz, at 11h. 30m. a.m., having passed within 20 feet of a rock which was supposed to be the Josyna Rock, but not in the same latitude and longitude as laid down in the chart, but by his latitude by observations, $30^{\circ} 13' N.$, longitude by chronometer $28^{\circ} 18' W.$ This rock was shaped like a sugar-loaf.

A rock, supposed to have been the same, was seen on the 1st of January, 1848, by Mr. John Gilchrist, of the brig Jewess, of Liverpool, who reported that in lat. $32^{\circ} N.$, determined by a meridian altitude of the sun, and long. $24^{\circ} 28' 30'' W.$ by chronometer, which, on arrival at Madeira, they found to be correct, they saw, at about a quarter of a mile distant, something which appeared to be a fish sporting in the water, but which, on taking the glass, appeared to be a flat rock, awash with the surface of the water. In consequence of being on short allowance of water, he was prevented putting out a boat for examination.

33. **HARCOURT ROCK.**—North of Bahamas.—Copied from the *Nautical Magazine* for March, 1834, page 129.—The following statement of this reported danger is made by Captain C. Huntley, of the ship Governor Harcourt. As we do not find that soundings were obtained near it, nor even tried for, we must be content for the present in laying the account of it before our readers, to place it on the list of doubtful dangers.

“I sailed from Belize, on the 17th of November (1833), and on the 30th November, about 8h. 40m. a.m., saw something on the lee-bow, and at about 9 came abreast of it. I, with the rest of the officers and passengers, saw distinctly that it was a coral rock. We were about 60 yards to the southward of it, I immediately hove the ship to, and lowered down the quarter-boat. Unfortunately the boat swamped, and with some difficulty, I got the chief mate and boat's crew on board again. I got some very good sights for an excellent chronometer, and by a very good observation at noon, and by reducing the ship's run, I find that this rock lies in lat. $30^{\circ} 49' 15'' N.$, and long. $78^{\circ} 27' 30'' W.$ from Greenwich. It was about 8 feet above the water, and in the fall of the sea it branched out to the N.N.W., about 30 feet distance.”

34. **CLEVELAND ROCK.**—This reef may be considered as not existing, Lieut. Artlett having sought for it without success. He says, “Four days were employed in searching for it by both vessels without success, and I can state with confidence that it does not exist, in the position hitherto assigned to it.”

35. **GANDARIA REEF.**—EXTRACTS FROM THE GACETA DE MADRID, MAY 28TH, 1842.—“The pilot and second captain of the Spanish merchant ship Dolores Ugarte (matriculated at Havana), from Guayaquil, made the following declaration on oath, at the residence of the captain of the port of Corunna. *That on Monday, the 18th of April (1842), 107 days from Guayaquil, they*

saw from the deck of that vessel, a group of rocks, about a cable's length in extent, and in the middle of them a large one, high and insulated, on which the sea broke violently. The latitude at the time they were seen was $25^{\circ} 29' 55''$ N., and longitude $31^{\circ} 0' 30''$ W. The latitude observed at noon was $25^{\circ} 40' 45''$ N., and longitude also, $31^{\circ} 12' 2''$, W. from Cadiz, at the prudent distance, which the vessel was from the rocks at the time, being that of 4 miles.

FROM THE GACETA DE MADRID, OF 1ST OF AUGUST, 1842.—In the *Gazette* of the 28th of May last, notice was given from this office of a new vigia, named the Gandaria Rocks, being placed on the chart, and to which was assigned an uncertain position for want of a more certain information. Having since received more exact accounts, this office, in compliance with its promise, proceeds to inform seamen, that the said may be considered as existing in the position assigned to it, the observations for latitude being excellent, and also those for longitude with the chronometer. Consequently it has been inserted in our charts without the notice "doubtful," which had previously accompanied it.

With reference to this danger, it may be also added that, in the archives of this office, is a statement of Capt. Don J. P. Garcia, dated Corunna, in the year 1790, in which, among the notices he had obtained, he gives the position of certain dangers, and among them one, which he places in lat. $25^{\circ} 20'$ N., and long. $31^{\circ} 22' 27''$ W. of Cadiz, which may be the same rock as that discovered by Gandaria, as the small difference of situation might very well arise from the instruments used in that day. As the above document contains no authority, nor states whether the position of it is obtained from estimation or observation, nor any reference by which its existence might be removed from doubt, it was not inserted in the charts with the view of not increasing the vigias on them. Now it becomes the duty of this office to publish every thing which may tend to show its undoubted position.

36. MARIA AND BONETTA ROCKS, &c., &c.—Extracts from a letter, addressed to the Secretary of the United States' Navy, by Lieutenant Commandant Charles Wilkes, commanding the South Sea surveying and exploring expedition, and dated on board the sloop Vincennes, at Rio Janeiro, November 27th, 1838. "The first reported shoal was the MARIA ROCK, in latitude $19^{\circ} 45'$ N., and longitude $20^{\circ} 50'$ W., which we stood for, and hove-to near the position, until we had ascertained our situation correctly by careful observations. The vessels were then spread, and the course marked, to run directly over the spot. The surface of the ocean, visible at the time from the squadron, was not less than 60 miles in circumference, with every opportunity which the clear weather could afford, and sufficient swell of the sea to have caused breakers on any shoal within 15 feet of the surface. Nothing, however, was discovered, and no bottom could be found with 300 fathoms of line. The next position examined was BOM FELIX SHOAL, said to be within 30 miles of the Maria Rock; this we searched for in the same manner, but were equally unsuccessful. We then stood for the place assigned to the *Bonetta Shoal*, to the eastward of Bonavista, said to be in latitude $16^{\circ} 32'$ N., and longitude $30^{\circ} 37'$ W. We in like manner hunted for this, and after exploring the locality of its position on the chart, I steered on the course of its reported bearing, E. by N. from Bonavista, until nearly up with the *Hartwell Reef*, lying in sight of Bonavista, which has, without doubt, been taken for, and reported as, the shoal named Bonetta. Our inquiries at St. Jago assured me, that the Madeline (the vessel last wrecked) was cast away on the *Hartwell Reef*, which has been reported as the *Bonetta Shoal*.

I am well satisfied that the positions assigned to the above three shoals, on the chart and their vicinity, are free from all dangers. I am of opinion, also, that the particular and indefatigable search made by Captain Bartholomew, of H.M.S. *Leven*, and the opportunities afforded me of covering, with the squadron of five vessels, so large a space, at the same time, ought to be sufficient evidence that no such dangers exist, as they are laid down in those positions, and should cause them to be obliterated from the charts.

From Port Praya we steered for *Patty's Overfalls*, as laid down in the chart, in latitude 11° N., and longitude $24^{\circ} 30'$ W., and had a good opportunity of examining their locality. A few rips were observed within a degree of the situation assigned them, but little or no current was found; and I feel confident in asserting that no danger exists in this vicinity, as we were becalmed in the position, and in close proximity to it for 48 hours, the squadron as usual being spread apart, and having a broad expanse of ocean under view. Owing to contrary winds, it was some days before we reached *Warley's Shoal*, said to be in latitude $5^{\circ} 4'$ N., and longitude $21^{\circ} 25'$ W. This point was also carefully examined, but no shoal, or appearance of shoal water, or any danger, discovered.

Our next examination was of a *French Shoal*, said to be (as laid down) in latitude $4^{\circ} 5'$ N., and longitude $20^{\circ} 35'$ W. This was also examined, and no danger or appearance of shoal discovered. From this point I took advantage of the southerly wind, and proceeded east, which carried me as far as 13° of west longitude, and over the position assigned to the shoal by the French hydrographers, to enable me to cross the equator eastward of the 17th degree of west longitude. We succeeded in crossing the equator in that longitude on the 5th of November, and then stood off the Triton's Bank, said to be in latitude $0^{\circ} 32'$ south, and longitude $17^{\circ} 46'$ west. When within a short distance of its position, the squadron hove-to, for the purpose of ascertaining our position accurately; after which, a course was steered nearly west. Being at the time well to the eastward, we ran on a line due east and west over it, the vessels of the squadron being spread about three miles apart, on a line north and south. We did not, however, find it in our progress, or any bottom, or indication of soundings; no discolouration of water was visible, or change of temperature, although the line extended 30 miles east and west of its reported position; after which, we again stood to the north, and ran over a *vigia*, as laid down on the charts, but none such was found in existence. Our next examination was for *Bouvet's Sandy Island*, which was, in like manner, carefully searched after, in and around its position, as laid down in the charts, but our search was equally unsuccessful."

Finally, search was made in and about latitude $2^{\circ} 43'$ S., and longitude $20^{\circ} 35'$ W. Extending to the N.N.W. of this point a distance of 30 miles, hereabout having been assigned as the situation of the sub-marine volcano, reported by Admiral Krusenstern, which it was supposed might have left a shoal. This locality was twice run over in different directions, and carefully examined, with the squadron in open order, but none such was found in existence."

Lieutenant Hudson, of the *Peacock*, having separated from me on the 16th of October, proceeded on a different course, in search of the same shoals which we were looking for, but was equally unsuccessful in finding any, as appears by the following extract from his report to me, which affords further evidence, if it were needed, of their non-existence.

"Having separated from you on the 16th of October, it was not until the 23rd that I had worked up to the *Warley's Shoal*; and, at 8 o'clock that night, *was directly on the spot where it was laid down on the chart*. We placed

good look-outs, and kept our patent lead going, for 50 miles, before reaching the location of this shoal, as laid down on the chart; also, observing our drift at night, in hope of sweeping over it at early day-light. I continued cruising in this vicinity in various directions, getting casts of lead in from 50 to 100 fathoms, without finding bottom. I now continued my examination, and after having swept over a circle of 40 or 50 miles, in different directions, am perfectly satisfied that Warley's Shoal exists nowhere in the neighbourhood laid down on the chart.

I then proceeded for the *French Shoal*, the wind ahead (S. by W.), where I arrived on the 25th of October, and continued cruising all the following day, with a fine breeze, immediately over the location of the shoal as laid down, and in every direction, for miles in its vicinity. After thus thoroughly searching the English locality of this shoal, I directed my course for the French position, 76 miles distant, making nearly an east course, with look-outs and the lead going, until I had run immediately over and around the spot, sailing in various directions a distance of 40 miles, without effect.

I then made the best of my way for the *Triton Bank*, with the wind veering and hauling from S.S.W. to S.S.E., and passed the equator, on the night of the 3rd of November, in longitude $17^{\circ} 40' W.$, and continued over and around the locality of that bank, until the morning of the 5th, getting casts of the lead during the time, in from 50 to 250 fathoms, up and down, without finding bottom. I have, in our search, fully satisfied myself, and hope our examination will prove equally so to you and all others that these shoals do not exist."

37. GARCIA SHOAL.—The existence of this shoal receives fresh probability from the following:—

"On the 17th and 18th of January, 1848, on board H.M. brig, *Villa Flor*, on her way from Loando to Lisbon, wind N.N.E. and N.E., fresh and steady. At 3h. 30m. p.m., on the 17th, the men on watch reported that a breaking of the sea was seen to leeward on the bow, and I and other officers having got up to the foremast crosstrees, saw, beyond all doubt, that it was a shoal, which we marked W. $\frac{1}{4}$ N.W., *magnetic*, at 6 miles distance; the ship being then to the eastward of it, and having taken the ship's reckoning to that hour, it was found that her position, at 3 o'clock, was lat. $12^{\circ} 30' N.$, and long. $28^{\circ} 56' W.$, the longitude being determined by a very correct chronometer, and the latitude by observation.

From the observations taken at noon on the 18th, and from the course followed, the ship ought to have passed over the shoal named the *Garia* or *Garcias*, as she was then in its latitude, and $11^{\circ} 45' W.$ of it, but I did not see it, which shows that the real Garcia Shoal is that which was seen at 3h. 30m. p.m., on the 17th. (Signed) P. V. du Costa Louveiro e Pinho.

38. DELAWARE SHOAL.—Captain Ross, in the brigantine *Delaware*, from Charleston, on the 16th September, 1839, at noon, in latitude $10^{\circ} 38' N.$, struck soundings in 37 fathoms, shells and sandy bottom. At 3 p.m. steering south, passed over a rocky bank, having 5, 7, and 10 fathoms, and bottom plainly seen: inferred from the distance run that the latitude of the shallow part of the bank must lie in $10^{\circ} 37' N.$, longitude, by chronometer, $60^{\circ} 3' W.$; at $3\frac{1}{4}$ p.m. had 70 fathoms water.

39. CÆSAR'S BREAKERS.—The following confirmation of their existence appeared in the *Nautical Magazine*, 1846. Page 613.

"On the night of the 4th of July last, at 7 p.m., fresh breeze, ship running 6 knots, saw breakers on the port bow, distance a quarter of a mile, strong currents setting towards them, wore ship and stood along them; when first seen, they bore by compass, N.W. by N., and seemed to be a long ledge o

rocks in a crescent shape; at 3 a.m. the following morning, saw the south-east end of the reef on the starboard bow; a strong breeze coming on prevented us making any further examination; the man, in heaving the lead, struck it upon a hard rock, but had no bottom the second cast.

"There can be no doubt as to the existence of this reef, and so convinced were the crew, that they stood ready to clear the long boat, neither was it any optical delusion from effect of current or phosphorescence of the sea.

"As they are in the longitude of vessels crossing the equator, it is surprising they have not been reported: by good sights at noon, with chronometer and computation of distance run, their position when seen, was lat. $3^{\circ} 07' N.$, long. $24^{\circ} 14' W.$ Charles Price, Supercargo.

40. BLAESDALE'S REEF.—The brig Richard, of Ulverston, Captain Blaesdale, on the 15th of October, 1819, struck on a coral reef, in about $0^{\circ} 56'$ or $0^{\circ} 57' N.$ and longitude, by *account*, beyond $41^{\circ} W.$ "In fine moderate weather, the ship going at the rate of 3 knots, at 6 p.m. grounded, and remained fast about 10 minutes. The water was smooth, and no breakers seen. Upon sounding a few minutes after, no bottom could be found at 125 fathoms. The vessel drew 11 feet of water, and in one hour there were 18 inches of water in the well. On a subsequent survey at Para three holes were found, each about the size of a man's hat, and nearly through the vessel's bottom, and several large pieces of white coral, as large as a man's hand, were found sticking in different parts."

41. ST. PAUL, OR PENEDO DE ST. PEDRO, is a cluster of five steep craggy rocks, without verdure, covered with birds' dung, and with no place fit for anchoring, or convenient for landing. This small island has been seen by Indiamen, both outward and homeward bound, although it is considerably to the westward of the common course of the latter; and no ship bound to the southward should cross the equator so far west. Its appearance is that of a heap of rugged rocks with gaps between them, and a modern navigator has said that a vessel may be aground upon them in the night, unless the surf beating up against them should be loud enough to apprize him of his danger, for close to them are 30 and 40 fathoms water. This islet, or properly speaking islets, may be seen at the distance of 3 or 4 leagues, and always makes like three sail when first seen. The current, hereabout, sets N.W. by N. (*true*) one mile an hour.

SECTION IV.

COAST OF BRAZIL.

GENERAL DIRECTIONS.—It is usual for ships bound from England to South America, or Brazil, to shape their course so as to give Cape Finisterre a berth of about 40 leagues, and, passing the Coast of Portugal, steer toward the Island of Porto Santo, or Madeira, making a large allowance for the current setting eastward, toward the Strait of Gibraltar, and south-eastward, toward the shore of Morroco, and still more southerly, toward the coast eastward of the Canary Islands.

After passing to the westward of Madeira, the track most advisable is to *the westward* of the Canary and Cape Verde Islands, at any discretionary distance, or *barely in sight* of them. By adopting this course you will not

only avoid the light winds and calms, which frequently prevail among these islands, as well as several dangers in their vicinity, but may reasonably expect a steadier breeze; although there are instances of ships, after passing in sight of the Canaries to the westward, having the wind from that quarter, which obliged them to pass to the eastward of the Cape Verde Islands.

During the winter months, those who are not desirous of stopping in Funchal Road, should endeavour to pass to the westward of Madeira; also, at any convenient distance, exceeding 6 or 7 leagues, because strong westerly gales prevail in November, December, and January, which produce severe squalls and eddy winds, near the island, on the east side.

Having passed to the westward of the Canary and Cape Verde Islands, steer on southerly, and endeavour to cross the line in and from 20° to 28° W. longitude, but by no means further to the westward, lest the westerly current which sweeps round Cape St. Roque, should lead you into danger; and in approaching the Coast of Brazil, considerable attention should be paid to the season of the year, periodical winds prevailing from S.S.E. and S.E., from March to September,—the current then runs northerly; but from September to March, the wind blows from the N.E. to E.N.E.,—the current sets to the northward. Mariners, therefore, should endeavour to make the land to the windward of the port they intend to touch at; and, according to these periodical winds, which commonly govern the current, when the sun is in the northern hemisphere, the winds on the Brazil coast will incline more from the south-eastward, than in the opposite season, when the sun is to the southward of the equator, for then they prevail to the eastward. It also appears, that in any season of the year, if the coast be not made to the northward of Cape St. Augustine, there will be no difficulty in getting to the southward; for ships which have made the land in latitude 7° and 8° , even in the unfavourable season, by making a few tacks, always readily proceed to the southward, and experienced little or no northerly current; nevertheless, in a bad sailing ship, it would be highly imprudent to make it to the northward of Cape St. Augustine, especially between the months of March and October, and certainly it never should be made to the northward of Cape Ledo, or near Cape St. Roque, on account of the S.E. winds, and W.N.W. currents, before-mentioned, which might fatally sweep you round to the northward of the cape.

Every navigator should, therefore, be attentive to the time of the year he makes the Brazil coast, there being a kind of monsoon or trade-wind blowing from the N.E. and E.N.E., with a current setting south, from the month of September to March; while, from March to August, the winds are from the S.E., E.S.E., and S.S.E., the current then setting north: according, therefore, to these seasons, he should run into a higher or lower latitude than the port he is bound to. From Cape St. Roque to Cape St. Augustine, the land may be approached by soundings, of moderate depth, and gradually lessening as you approach the shore. A strong southerly current commences from Cape St. Augustine, about the middle of October, and continues until January. No particular current succeeds till the month of April, when, generally about the middle of that month, a strong one sets in northerly until July, when it again subsides until October; and near the shore, the wind, for nine months in the year, generally blows north-easterly in the morning, and north-westerly during the night, continuing, gradually changing along the coast, until, at Rio Janeiro and the Rio de la Plata, it becomes a regular land-breeze from evening to morning, and throughout the day the reverse. From the end of February till the month of May, the wind is

mostly from the south, blowing strong and stormy, with frequent squalls from the S.W.

THE NORTHERN COAST.

CAPE ST. ROQUE is a headland lying in lat. $5^{\circ} 28' 17''$ S., and long. $35^{\circ} 17'$ W., at nearly 27 miles to the S.S.E. of Point Toiro, or Calcanhar, the N.E. point of Brazil. To the northward of Cape St. Roque, the coast gradually falls, or declines in height, as far as the distance of 8 miles, when it forms the low Point Petetinga; here the shore on the north forms a low bay. The point is not more remarkable than Cape St. Roque, and is to be ascertained at a distance, by the difference of latitude only. The extremity of Point Petetinga is given by Baron Roussin in latitude $5^{\circ} 21' 35''$ S., and longitude $35^{\circ} 19' 23''$ W. Point Toiro, or Calcanhar, in latitude $5^{\circ} 8' 20''$ S., and longitude $35^{\circ} 30' 33''$ W., is situate at the distance of 6 leagues, N.N.W. $\frac{1}{4}$ W. (N.W. by N.) from Point Petetinga. From Cape St. Roque to Point Toiro, the shore is bordered by the Recife, or that remarkable ridge of coral rock, which characterises the coast in general. The more elevated part of this reef, within the present extent, named Pedras de Garca, is about 8 miles to the northward of Point Petetinga, and near it there is good anchorage.

BANKS OF ST. ROQUE.—These banks commence at Cape St. Roque, in the south, and terminate beyond Point Tuberao, or Tuberon, in the N.W., an extent of 34 leagues. The northern edge lies in latitude $4^{\circ} 51'$ S.; the longitude of the N.E. part is $35^{\circ} 25'$ W., and of the western part $36^{\circ} 30'$ W. Between the shore and the banks there is a channel, which is known and used by the coasters; there are also passages between the dangerous spots on the banks, but they should never be attempted by strangers. The shallowest parts of the bank are distinguished generally by breakers; of these the easternmost is a little to the west, distant about 4 leagues from Point Toiro, but its breakers are seldom seen. The second lies to the west, off a point named Tres Irmaos, or the Three Brothers; this is named Lavandeira, and occupies a great extent from east to west. The third, or westernmost, is a group of rocks, named the Urcas, in longitude $36^{\circ} 18'$ W. The breakers on the Lavandeira and Urcas are very heavy at all times, but particularly when the wind blows from the offing towards the shore. The Bank or Paracel of St. Roque, with 6 or 7 fathoms, terminates at about 6 leagues west from the Urcas. On approaching to the edge of the bank, soundings of light sand will be found, with an admixture of broken coral, and a sudden discolouration of the water from a blue to a green colour. Hereabout the tide rises from 6 to 8 feet. From the outer edge of the bank, the coast, although low, may generally be seen, in clear weather, at from 10 to 12 miles off.

Beyond Point Toiro the coast, extending W.N.W., is generally low, having few distinguishing objects. To the south-eastward of Ciara there are, however, many inland hills, and the coast is bordered with a remarkable ridge or reef of coral rocks. This reef, with frequent breaks, continues along shore 19 leagues to the north-westward of Ciara; and within this extent the land is moderately high, but it declines thence westward, and presents a low shore, with sand-downs, some of which are very little above the surface of the sea. The soundings are mostly regular, and decrease gradually toward the shore, from a distance of 4 or 5 leagues.

POINT DO MEL, in latitude $4^{\circ} 55'$ S., and longitude $36^{\circ} 50'$ W., is a broad headland, bordered with the Recife, and dividing two spacious bays on the

east and west. The extreme points of these are Point Tuberao, at 10 leagues to the E.S.E., and the Morro Tibao, or Little Reteira, at 6 leagues to the W.N.W. The bank of soundings here extends to 4 or 5 leagues from shore.

ANGERSTEIN REEF.—In the month of December, 1830, the brig Angerstein, John Bouch master, passed through a cluster of rocks, thirteen in number, and from 2 to 3 fathoms under water. The vessel ran close alongside of one, which was quite visible under the water, and the master, heaving the lead on it, had not more than 11 feet of water. Mr Bouch describes the rocks as of a dark brown colour, showing themselves sufficiently for a vessel to pass clear of them; and before a second cast can be got, you may be in 10 fathoms of water. “They lie in a triangular form, about 11 miles from the land, with Point do Mel S.S.E. $\frac{1}{4}$ E., and the Red Mount on the Reteiro W.N.W. $\frac{1}{4}$ W., about 8 leagues; with the given bearings and distance from land, the latitude must be $4^{\circ} 44'$, or $4^{\circ} 45'$ S., and longitude $37^{\circ} 6'$ W. Like the Urcas, at 15 leagues to the eastward of them, they seem to lie on the edge of the flats, where there is a depth of 6 fathoms, corally ground.”

ARACATI.—The first port of the Northern Coast of Brazil is that of Aracati, on the River Jaguaripe, a place of rising consequence. The mouth of the river is in latitude $4^{\circ} 23' 30''$ S., and longitude $37^{\circ} 49'$ W. At the entrance is a narrow and dangerous bar, owing to sand-banks on each side, and upon these the surf is very violent. The sand is so loose at the mouth of the river, that, even with the coasting-vessels of the country, every precaution is required. Within the bar the river widens immediately, and forms rather a spacious basin.

Mr Richard Dixon, commander of the Westmoreland, of Liverpool, says, “As vessels frequently engage at Pernambuco, on the eastern coast, to load a cargo, or part of a cargo, at Aracati, they consequently proceed, in the first instance, to the N.N.E., and then N., until they have passed Cape St. Roque, and the parallel of the extensive flats on the north coast, bearing the same name. The latitude of the Urcas, the most dangerous reef on these flats, is $4^{\circ} 50'$ S., in the longitude of $36^{\circ} 18'$, or thereabout. On approaching near enough to the shore, Point do Mel will be seen, composed of red cliffs, and low white spots of sand on each side of them. This point must be avoided, for when it bore about S.S.E., at the distance of 7 miles, we were on a shallow bank of 17 feet, and farther to the leeward the water appeared white, and, without doubt, was shallower. Running along shore north-westward, and and keeping in about 6 fathoms, Point Reteiro Pequeno, formerly named Cape Corso, will be seen, and also a mountain, appearing blue in the interior; the former appears red, being a large bank of red sand, and the latter resembles Bardsey Island, in the St. George's Channel. When these two objects are in one, the Reteiro Grande, or Algeberana Head, will be distinctly seen. The land to the south-eastward of this head, for 3 or 4 miles, has a very singular appearance, forming like two steps, the lower part being reddish, and the other grey. The head itself is rugged, and has a pinnacle close to its base, which, when bearing W. by S., will appear open.

At the distance of about a mile there are several rocks, of which the outermost is covered at high water; it is necessary, therefore, to give this head a good berth, until a large lump, or hill, situated on the S.W. side of Reteiro Bay is brought to bear S.W.; then steer toward the hill, until Reteiro Head bears E.S.E. With these bearings there is safe anchorage in 3 fathoms of water; or if the vessel's draught will admit, you may go farther in, and have smoother water, as the rocks off the head break off much of the sea. The distance from this place to Aracati is about 21 miles, and a great part of the

way is along the sea-shore. The course from this anchorage to the bar of Jaguaripe is about N.W. $\frac{1}{4}$ N., the distance 20 miles.

The land in the vicinity of the bar is very barren; on the north side of the entrance is a high red bluff, and also two rocks close to the water's edge; one of these has the appearance of a large gun mounted, with a small fort and flagstaff, and some huts close to it. These objects, together with the spit of sand on the S.E. side, the breakers across the mouth of the river, and the smoothness of the water within them, are good marks by which the entrance may be readily known.

In proceeding towards the bar, a low spit of sand will be observed, which forms the S.E. side of the entrance of the river, and a ridge of heavy breakers parallel to the shore for 2 or 3 miles, without any appearance of a passage. We approached them in our boat, and, perceiving a buoy, we soon got within the breakers, where we ascertained that this was not the channel used by the pilots, although there were 6 feet water in it at low water. The best channel is farther to the N.W.; for, besides having 3 feet at low water, it affords an easier passage out, as it lies in a N.E. and S.W. direction; whereas the former lies nearly E.N.E. and W.S.W., and is very narrow.

Both of these channels are liable to shift, and therefore every master ought to make himself acquainted with the state of the bar before he attempts to enter. Buoys or boats may be readily placed in the channel, or perches may be fixed on the spits or on shore. He should also know the time of high water, and take the bar half an hour earlier. After passing the boat or buoy, that should be moored in the deepest water between the breakers, it will be necessary to haul up S.S.E. or South, to clear a bank on the west side that nearly dries at low water, (On this bank, as well as on that to the north-eastward of it, perches ought to be fixed.) So soon as this bank is cleared, the depth will increase, and a westerly course must be taken, in order to pass between the high sandy beach on the starboard, and a low bank that dries at two hours ebb, on the port hand. This channel, not a furlong in width, is by the pilots generally named the Funnel; and there are usually 10 or 12 perches along the edge of the low bank. Having passed this narrow channel, it is proper to haul to the southward, to get under the sandy point on the south side of the river, into smooth water. In advancing towards O'Neil's Bank, which must be approached with caution, keep the lead going, and tack in good time, in order to get close to the weather shore. The channel between this bank and the shore is deep and narrow, but after passing it, there is good anchorage in $3\frac{1}{2}$ or 4 fathoms, where vessels generally anchor, when waiting for a wind or tide to go out.

A vessel, whose draught of water does not exceed 10 feet (and it would be imprudent to be much deeper for passing the bar), may sail up, at two hours' flood, to Cook's Anchorage, where vessels generally load; and by waiting for more of flood, she may go $2\frac{1}{2}$ miles still farther up, and take in a cargo safely.

Sailing out of this port is more dangerous than coming in, as the wind is only favourable for passing the bar during three hours in the morning, and even then it cannot be depended upon. Should it fail, or head in the least, the vessel would be in imminent danger, as a heavy sea is always running on the bar, and the channel is so narrow, that anchoring would be useless. When a vessel has been conducted through the Funnel, and as far down as the lowest perch, and being on the starboard tack, as much canvas should be set *as she can carry* in order to give her good way over the shallowest part, and *through the breakers*.

No vessel should attempt to go out, if it has been blowing hard the day before, as a heavy sea will then be on the bar, and probably the breeze not regular.

According to the pilots and inhabitants of the place, the channels often shift. The banks being composed of quicksands, the river, when swollen with rains, forces its way through them in various directions, and sometimes forms new channels, so that there is no certainty of their being long in one position. It is also affirmed, that the channel is seldom deep enough till after the river has been raised by continued rains, and that, in the dry season, vessels may be detained for months, for want of sufficient water."

The old hydrographer, Pimental, gives the following description of the coast between Point Toiro and Aracati, viz.—"Off Ponto das Pedras (Point Irmaos of the modern charts) there are three shoals of rocks, having a channel between them and the main, of 3 and 4 fathoms; at 3 leagues outward are reefs above water (the Lavandeira on the chart.) Off the River Guamara (Aguamarea) to the S.W. the distinguishing marks are two inland sugar-loaf mountains, of unequal heights. To the west is Point Tubarao, then follow the Rivers Amargosa, Cavallos, and Conchas. The coast hence trends N.W. to the Ponto do Mel, or Honey Point, which may be known by its high red cliffs. At the River Upanema (Mossocro on the chart) the land is very level; and on the west of the river there are, as far as a field-piece can carry, red cliffs. Within the land is Monte Vermelhos, (Mount Tibao) a sugar-loaf hill. Ships, however, should not advance into the bay, as it is full of shallows.

From the River Upanema, to the N.W., the next river of any consequence is Jaguaripe, which may be known by a round bare hill of sand, on the N.W., terminating in a rock below, and within land a mountain, having seven sugar-loaf points. Five leagues inland from the Jaguaripe rises the range of the Gumame Mountains, which extend to 10 leagues east and west, commencing at about 3 leagues from the River Jaguaripe; the land for nearly 4 leagues, close to the sea, appears dark and full, with several openings close to the bays. At about half a league from the commencement of these openings are some white cliffs, in shape like a schooner, with all sails set, and head at east. So soon as this full land terminates, the coast assumes a more flat and level appearance."

From the mouth of the Jaguaripe to Point Macoripe, on the east of Ciara, the coast trends N.W. true, and the distance is 20 leagues; it is all bordered by a reef. The Bay of Iguape, as described by Pimental, is about 5 leagues to the south-eastward of Ciara, which now appears to have a village on it, and forms a small harbour to the westward of some low level land. The bay is surrounded by some very steep cliffs, against which the sea breaks violently; here is a high and round rock, behind which is good and sheltered anchorage, in 2, 2½, and 3 fathoms; and to the N.W. of it, you may anchor in the roll of the sea, having 4, 5, and 6 fathoms; there are also several pits made on the sand, where water may be obtained with ease and in plenty.

CIARA.—The bay on which this town stands, is formed by Point Macoripe to the eastward, and by the River Papina to the westward, an extent of about 3 leagues. It is extremely open, its greatest depth being 3 miles. Before the town, at the distance of half a mile from the shore, extends a ridge of rocks, within which small craft generally anchor, the entrance to the anchorage being round the eastern end of the reef. Point Macoripe* has a battery and tower near the extremity, and is itself a high and irregular sand-hill.

* On this point a fixed light is shown, at a height of 87 feet above the sea, visible 10 miles.

terminating in a point. The recife, or reef, forms a complete ridge, at a considerable distance from the shore, and it is to be seen at low water. It extends parallel with the shore for about one quarter of a mile, with two openings, one above, and the other below the town; a small vessel may come to an anchor between it and the shore, but a ship can bring up only in one of the openings of the ridge, or on the outside of it. A vessel coming in from the northward should make Point Macoripe, which is $2\frac{1}{2}$ miles to the eastward of the town, and may thence bring up in 6 or 5 fathoms. On the appearance of a ship, the town fort displays, or did display, a white flag upon a flagstaff.

To the northward of Ciara, about a mile from shore, is the Pedra da Velha, or Old Woman's Rock, known even at high water by the breakers over it; within this, at half the distance, is another, named Lobvendo, and next, that portion of the recife, or reef, within which and the beach small vessels may anchor. Eastward of the latter are three other rocky patches, of which the last is three-quarters of a mile to the west of Point Macoripe; and between this and the point is anchorage under the latter, in 5 fathoms.

The inner anchorage, above-mentioned, is between the recife, or reef, and the shore. You enter by the eastern channel, and go out by the western, when you cannot fetch out by the eastern one. Here a vessel lies, at low water, surrounded by breakers, except in the channels, and, as the pilots are very inattentive, it is altogether very dangerous.

Baron Roussin says, "Ciara anchorage cannot be considered as a harbour, being exposed to all winds between N.W. and E., which are frequent hereabout; but the ground is excellent for holding, from three miles off the land to the reef, which includes the inner roadstead. In the outer roadstead, at from one to three miles from land, are from 6 to 10 fathoms of water, bottom of soft sand-stone, covered with sandy ooze, and in which the anchor holds well. The coasters enter the inner road by two passes, formed in the reef, at 200 fathoms asunder,—the depth in these passes is about 13 feet at high water.

DIRECTIONS FOR CIARA, BY CAPTAIN THE HON. W. WELLESLEY, R.N.—
"Ciara cannot be called a port, nor in any but a tropical climate would it be thought a secure roadstead. I believe it to be perfectly safe, particularly from December to May; and we have the precedent of several large ships, namely, the American frigate Constitution, during the war, and soon after, the Inconstant and Isis, English frigates, having laid there with impunity.

When bound for Ciara, run down in the latitude of Point Macoripe, to which give a good berth, until the castle bears S.W., then run down direct for it, until Macoripe bears E.S.E.; do not go any further in, until a pilot comes off, which will be in a catamaran. There are four high mountains, about 5 leagues to the S.W. of the town, which may be seen when 9 and 10 leagues in the offing, by which the port of Ciara is easily distinguished.

Point Macoripe is a sandy bluff, terminating abruptly enough at the sea. If you know your longitude nearly, it cannot well be mistaken, and the land on this part of the coast is tolerably high. Running in towards it, you will discover a reef breaking off, and inside of it, a good berth will open the town, and see the steeple, &c.

From 11 and 10 fathoms (standing in for the town) you will shoal your water to 7 and 6, when you may anchor or heave-to, and wait for the pilot, should he be coming off. If there are any merchant-vessels lading, they will be well to the westward, protected in a small degree by a reef of rocks.

The landing is very difficult and uncertain. It can only be effected from

half-tide to half-tide, and then by the help of the town's people, who, with their negroes, are in attendance, to carry you out of the boat in a chair. This is owing to a reef of rocks (round either end of which is the boat-passage in) that lies in a direction parallel with the beach, and about 300 yards from it: these begin to appear at half-ebb, and then make a kind of break-water until half-flood, when the water dashing over them, creates a surf, in which it is impossible for a boat to live. The pilotage charged for the *Sapphire* was eight Spanish dollars.

From this place I steered a N.W. $\frac{1}{4}$ W. and N.W. course, along the land, at not more than 4 miles distance, in from 13 to 11 fathoms, until I came to the village of Curu, a distance of about 30 miles; when I got abreast of it, the decrease of soundings to 9 and 7 fathoms warned me to haul off. There is a heavy breaking shoal running off the point on which the village stands; and in any case any one not knowing his longitude should make it, it may not be amiss to state, that we saw catamarans, with their sails hoisted to dry on the beach, which had exactly the appearance of large boats sailing upon a river, until the regularity of their distance, and a nearer approach dispelled the illusion. Hauling out for Curu, the water did not deepen for a considerable time. I made Curu to be in latitude $3^{\circ} 28' S.$, longitude $39^{\circ} 0' W.$ "

From Point Macoripe the coast trends N. $56^{\circ} W.$, true, to Mount Melancia, a distance of nearly 19 leagues. This mount, so named, is an insulated sand-hill, near the coast; all this coast is sterile and desert in the part next the sea, and shews no trace of culture nor inhabitants. The coast is clean, and at two or three miles from it are found 6 to 13 fathoms of water, with fine grey sand. From Mount Melancia the coast trends N. $64^{\circ} W.$, true, 11 leagues, to the village of Almufedas; then N. $69^{\circ} W.$, 5 leagues, to Point Topagi. The village of Almufedas, standing within the sand-down on the shore, is situated on the border of a small river, Aracati Miram, navigable by coasters. From the offing its steeple may be seen among a group of cocoa-trees. This village serves to indicate the commencement of the bank, which extends thence nearly to the little hamlet of Jericoacoara, situate about 40 miles more to the westward.

Captain Wellesley says, "If the land be fallen in with so far to the eastward as Ciara, it will be higher than any to the westward, and the magnificent mountains, some leagues inland, (the only fine feature on the northern coast of Brazil) will be seen. Point Macoripe, which forms the entrance of Ciara, may be known by its being a sandy bluff, terminating rather suddenly. But, upon whatever part you advance, it is just clearly discerned off the deck, that is, if your object be to make a free passage.

If you come upon it towards the evening, and have run sufficiently near to make it out, as has just been said, N.W. by W. $\frac{1}{4}$ W. will not be more than a safe course to haul off on for the night; or you may stand off to 22 fathoms, in about $2^{\circ} S.$, and into 17 fathoms. It is seldom, under any circumstances, that vessels find themselves farther off the land than they expected in the morning.

I was in less water than 10 fathoms the whole of the first night I was on the coast, but I would not willingly go so near again, being sensible not so much of the danger, as of the inutility of such a close approach."

Off Mount Melancia, a bank commences, which extends to the River Igua-rassu, a distance of 45 leagues. This bank, which is named Praal de Caracu, extends outward about $3\frac{1}{2}$ leagues from the shore, and is circumscribed by the depth of 6 fathoms. Upon the bank, off Almufedas, there are $4\frac{1}{2}$ fathoms distant 5 miles from the shore, and at 9 miles north from Point Tapaji are

fathoms. From the edge of the bank, in 7 fathoms, the water gradually shoals to half a fathom near the shore. Those approaching may therefore advance safely, by keeping the hand-lead going. Large vessels, proceeding westward, should keep off at 12 miles from the land, the coast being so low, that at a safe distance the tops of coca-trees only can be seen, and in the finest weather. When westward of Jericoacoara, the draught of the vessel, and soundings, will determine the distance to which it may be proper to approach the bight.

JERICOACOARA.—Between Point Tapaji and the Point of Jericoacoara, the coast trends nearly east and west, a distance of 27 miles. Jericoacoara is a cove formed, by the broken ridge of rocks which borders the coast, into a small basin, between them and the shore. The waves frequently beat high on the reef, and break over it into the basin. By digging pits on the beach hereabout, potable water may be obtained. Spring-tides, in the basin, rise from 10 to 12 feet. The coast to the westward is a low shore of white sand, having without it the ridge or border of rock, before-mentioned. Hence follow, the mouths of the little rivers Camusin, Tapuya, Temonha, &c. The first of these is the only one navigable for coasters of any draught.

PERNAIBAO, OR PARANAHYBA.—That part of the coast of the province of Piahy, extending from the Barra de Iguarassu, the easternmost branch of the Rio de Pernaibao, to the Barra de Tutoya, its westernmost, has generally been laid down incorrectly in the charts. The distance between these two mouths is about 30 miles, in which extent the Rio de Pernaibao discharges itself by four others, named the Barra Velha, Barra do Meio, Barra do Caju, and Barra das Canarias. The Harbour of Tutoya, on the west, is the only harbour, along the extensive line of coast between Bahia and the Maranon, that admits of the bar being crossed at all times of the moon, by vessels drawing from 14 to 15 feet water.

The Bar of Iguarassu and the Barra Velha, the two easternmost passages, have become unnavigable for ships; and in consequence of the formation of two sand-banks immediately to leeward of them, vessels must proceed to Tutoya, for which branch of the river a pilot may be obtained. Of the rock named Pedrado Sol, between the Barra Velha and Barra do Meia, as exhibited on the chart, Admiral Roussin says, "that it is not a danger really to be dreaded, being only a break of the reef on the coast, and does not extend more than a mile along shore." It is advisable not to approach the coast of the mouths of the Pernaibao nearer than to 4 or 5 miles, and not farther in than to a depth of 8 fathoms; the sea is muddy, and the bottom of oozy sand before these passages; the ground is therefore bad for anchoring. At 4 or 5 miles from land, 8 or 10 fathoms may be found.

To the westward of the Port of Tutoya the coast is not so high, but exhibits sand-hills of a shining white colour, without any verdure; these are named the Lancoes Pequenos, or Little Sheets, and occupy an extent of coast terminated by the River Perguicas, near which are some breakers.

THE RIVER PERGUICAS separates Lancoes Pequenos from the Lancoes Grandes. A long spit, extending from this river, is formed by the tide of the river meeting the current of the sea. The Sapphire, Captain Wellesley, crossed this bank by night in 5 fathoms, but in 7 fathoms a ship will be quite close enough. If the coast be made from the northward, about the Perguicas and Lancoes Pequenos, soundings will be struck in 19 or 20 fathoms, and soon after, in 13; and from thence regular bottom will be found in 10 or 11 fathoms, until the vessel is close enough to haul off, and steer along the land. *In keeping 8 or 10 miles from this part of the coast, you will be at*

sufficient distance to avoid all danger, and thus you will have from 7 to 14 fathoms.

To the west of the River Perguicas, the coast trends N. 65° W. to N. 80° W. It resembles that which precedes it to the east. Its downs are of shifting sand, moderately high, and extending nearly 12 leagues. They resemble, in appearance, linen cloths, or extended sheets, and have received the name of Lancoes Grandes, or Great Sheets, in contradistinction to a range to the eastward, named Lancoes Pequenos, already noticed. This appearance is remarkable, and useful as a landfall to those coming in from sea, when bound to Maranham, &c.

To the westward of the Lancoes Grandes, the coast appears as if wholly covered with bushes and groves, so closely set, that at the distance of 4 miles the ground between them is not to be seen. The shore is low, and is named the Praya das Mangues Verdes, or Beach of Mangroves. The sudden transition of colour here, from that of Lancoes, renders it impossible to mistake this part of the coast.

Bank off the Coast of Para.—In the “*Annales Maritimes*” for 1838, it appears, by a notice, that a French ship grounded on a bank off the coast of Para, the position of which, according to the account given, we can only suppose to be in latitude $2^{\circ} 18'$ S., longitude $43^{\circ} 7'$ W. of Greenwich. The following is the notice alluded to, which is an extract from a letter of Mr. Chas. Leraistre, commander of the ship Emily, of Nantes:—“When passing the Lancoes Grandes, and N. by E. of the most remarkable sand-hill, 7 or 8 miles from land, in 7 to 9 fathoms, at half-past twelve, p.m., the Emily got into shoal water, upon a bank of $2\frac{1}{2}$ fathoms, which appeared to be of small extent, around which I found 7 fathoms. The vessel was going two knots at the time, and at noon was in $2^{\circ} 20' 2''$ S. latitude.

This bank is very dangerous, because it is situated in the route that a large vessel would take, and at a distance from the land that would remove all apprehension of danger. It was low water when I touched, or thereabouts, and from aloft only one green patch of trifling extent was to be seen resembling others on those shores. Two of the shocks were rather violent, but not sufficiently so to produce great danger. The vessel made no water, nor do I consider the false keel was damaged.”

ISLAND OF SANTA ANNA.—This island is equally covered with mangroves and other trees: on advancing you will see the breakers which lie about, and to the eastward of it, of which the easternmost are 8 miles from the N.E. point of the island. Near these shoals are from 7 to 24 fathoms of water, bottom of sand. The Coroa Grande, a vast flat of rocks and sand nearly even with the water, lie to the west of St. Anna's Island, and extend about 5 leagues to the northward of Maranham Island.

Light-House on Santa Anna Island.—This light-house is a square tower, having three distinct stories, each story diminishing as it rises. The angles bear North and South, and East and West. Its height is about 90 feet above high water, spring-tides. In the day-time it has the appearance of a vessel under sail, at a considerable distance: by night it shows a revolving light, visible every 30 seconds, for about 10 seconds together; at a shorter distance the lights show as a permanent light, like a bright star, with a brighter light every 30 seconds.*

Between the continent and Maranham Island is the inlet of Bahia de St. Jose, which is too shoal and dangerous, even for small vessels, for a passage

* A Correspondent to the *Nautical Magazine*, in 1844, remarked that no dependence was to be placed on seeing this light, as it was very badly attended to.

to the port of Maranham; the bay of St. Marcos, to the westward of Coroa Grande, is therefore the general entrance. The tide sets with great strength into the Bahia de St. Joze. The flood from E.S.E., the ebb from W.N.W. High water at about 6h., p.m.

DIRECTIONS FOR THE NAVIGATION FROM CIARA TO MARANHAM.—From Ciara the coast trends N.W. by W., 35 leagues, to Point Tapji, and thence West, 10 leagues, to Jericoacoara; but a N.W. course should be pursued, in order to avoid the shoal parts of the Bank of Caracu. Having run about 34 leagues upon the N.W. course, allowing about $1\frac{1}{2}$ mile per hour for the current's assistance, in soundings varying from 11 to 20 fathoms, alter the course to W. $\frac{1}{4}$ N., and it will give you a sight of the land, as far as the Island of St. Anna.

Vessels coming from sea and bound to Maranham, should always endeavour to make the land considerably to the eastward, most particularly on account of the currents which prevail on the coast, always running strongly between W. $\frac{1}{4}$ S. and W.N.W. If in endeavouring to make the land, you should be in latitude about 3° S.; on discovering it you will be off Mount Melancia, or between it and Ciara; or should you discover three mountains, lying nearly S.E. and N.W. of each other, these will show you to be still nearer to Ciara, for these mountains are only 7 leagues distant from Ciara. About this part of the coast you will have a bottom of fine sand and shells, but if you should make the land in from latitude $2^{\circ} 15'$ S. to $2^{\circ} 30'$ S., and have a bottom of small red and white stones, or broken pieces of coral, you will be off Jericoacoara; if the bottom consists of blue, red, and yellow stones, you will be off Parahyba, or Temonia, and three mountains in the neighbourhood of the latter will be seen.

The whole coast from Point Macoripe to Parahyba is sandy to about half a league inland, so that it is equally distinguishable from the coast between Parahyba and Green Mangues (mangroves) Point, which consists of nothing but sand, without the least sign of vegetation. Inclining to the shore, and observing the lancoes or sand-banks well as you proceed along, the entrance of the River Perguicas will easily be distinguished, and when that opening bears S.S.E., the water will begin to lessen in depth, and the hillocks on shore become somewhat larger and more irregular; being in 8 or 9 fathoms you will cross the spit or bar of sand, thrown out from and accumulated at the mouth of the river, the stream of ebb from which turns the current somewhat to the N.W. from here. Should night be approaching, haul up, and stand off and on till morning, in from 24 to 12 fathoms; it is advisable to pass the Perguicas before this be done, that with the dawn of the ensuing day you may pursue the same course, keeping the same distance from the shore; for by bearing up, under all the sail you can, you may have sufficient daylight before you to reach your destination.

Having passed the Lancoes Grandes, you will easily distinguish Green Mangues Point, by the brushwood and re-appearance of vegetation; and when this point comes about S. by W., look out for the Island of Santa Anna.* Bring it to bear S.S.W., and having so done, haul off N.W. by W.,

* Captain Livingstone, in 1824, says, "A dangerous shoal exists at about 10 or 11 miles to the eastward of St. Anna's Island. Many vessels have narrowly escaped it. We got into 3 fathoms, with St. Anna bearing W. by N. The bottom was of fine sand, in ridges, with even 10 fathoms between; but I have no doubt there are also coral rocks, from the manner in which the sea broke, at a little to the westward of us. About the same time, a French brig in company, the *Cæsar*, of Marseilles, struck and unshipped her rudder, at about a mile and a half to the N.E. of us, though her master assured me they never found less than 6 fathoms. We had one cast of only two fathoms, but did not touch; so that the lead must have either hit the top of a coral rock, or else a knob of sand.

The Island of Santa Anna shows quite level in the direction we made it, and I think cannot be less

until you get into about 2° S., or a little to the southward, of 2° , then stand on due West, and you will lose sight of the Island of St. Anna. In steering this course and approaching Sta. Anna you must be careful to avoid the Cæsar Shoal. At about S.S.E. you will be abreast of the Coroa Grande Bank, then, keeping a look-out from the mast-head to the southward, should breakers be seen, or your depth become less than 18 fathoms, haul out half a point, but no more. By your N.W. by W. course, the distance to be run should be 13 miles; then, on the westerly course, 11 miles, allowing a mile an hour for the current, when you may proceed W.S.W., until you perceive Mount Itacolumi ahead, and the coast of Tepitapera to port; and so soon as you see Itacolumi Mount, which resembles a gunner's quoin, endeavour to bring it to bear W.N.W., and, according to judgment, about 4 leagues distant,* then proceed, with the lead going, 4 leagues, when you will have St. Mark's Point bearing South, at about $3\frac{1}{2}$ miles distance. From the lighthouse, on St. Anna, Mount Itacolumi bears W. $\frac{1}{4}$ N., nearly 15 leagues.

Baron Roussin says, "that the breakers of the Coroa Grande, with those of the Island of St. Anna, may sometimes, in clear weather, be seen from the mast-head at 3 leagues off, and from the deck of a corvette or sloop, at half this distance. They are divided into several groups, and always show, although the tide rises 12 feet. The only difference in their appearance is produced by the state of the tide, or the greater or less elevation of the waves." The northernmost point of the breakers on the Coroa Grande is given, by the Baron, as in latitude $2^{\circ} 10' 50''$ S., longitude $43^{\circ} 57' 32''$ W. On approaching the Coroa Grande from the north, when the sky is not clear, you may distinguish the coast of Maranham Island from that of St. Anna, by its being higher, its masses woody, and a bold white shore on the north.

MARANHAM.—This island is about 10 leagues in length, and 5 leagues in breadth; and between it and the coast, on the west, is the bay of San Marcos, navigable in the greatest part of its extent for large vessels; frigates also may anchor before the Harbour of St. Luiz, situate on the western coast of Maranham. The principal entrance of the bay lies N.N.E. and S.S.W., and being limited on each side by dangerous shoals, must be approached with caution. In this entrance, between the Coroa Grande on the east, and the

than 12 miles long, in place of two or three, as commonly laid down. I have spoken with many who concur with me in this opinion, and one who has been on it states it as 12 miles long and $3\frac{1}{2}$ or 4 broad. From the appearance of the island,† and the depths of water, both the French Captain and myself thought we were on the Coroa Grande, or Grand Crown, to the westward; and as night was rapidly coming on, we both anchored,—we in 19 fathoms, and he, at half a mile west of us, in 25 fathoms.

THE CÆSAR SHOAL (so called by me, from the French brig above-mentioned) lies about two miles South, and as much East, of the place we anchored at, the evening after we were in such shallow water on it. The position of this spot I ascertained as follows:—Latitude, by mean of meridian altitudes of the stars, *Fomalhaut*, *Canopus*, and *Achemar*, $2^{\circ} 10' 13''$ S.; longitude by five sights of distances, of ☾ and *Aldebaran*, west of ☾ $43^{\circ} 29' 15''$. By five sights of distances of ☉ and ☾, the sun east of the moon, $43^{\circ} 29' 0''$. The accordance of these results may be considered as confirming their accuracy, and they corroborate those of Captain Hewett.

The shoal I consider very dangerous, and I think it extends three miles and a half, East and West, and three North and South; but there is, at least, one other at a short distance south of it. It is to be observed, that the Cæsar shoal lies in the very track formerly pointed out in the Sailing Directions for making Santa Anna."

† At this time, it is to be recollected, that the lighthouse was not erected.—EDIT.

* Alcantra Point will then bear S.W. $\frac{1}{4}$ S., when they may anchor, if necessary. The channel here is wide, and the bottom sandy; in many parts the water will appear muddy, while in other parts it is transparent and clear; and at all times a kind of chesnut fruit will be seen floating about, which, in rainy seasons, drifts much to seaward.

continent on the west, is the Middle Bank, about $3\frac{1}{2}$ miles long, N.N.E. and S.S.W., having over it from 6 to $2\frac{1}{2}$ fathoms. Its western side is steep, and should be approached with caution. On the eastern side the soundings are more gradual, but the channel on this side is now much narrower than formerly. The Middle Bank, latterly, has been described as connected with the Coroa Grande, being divided only by a swash between, of 7 to 9 fathoms; it is not the one by which vessels generally enter, the western one being the superior and ordinary channel.

St. Luiz.—This city is situated on the western coast of Maranham Island, and extends nearly $1\frac{1}{2}$ mile in an E.N.E. direction. It comprises some small streets and squares, but is too much sheltered from the sea-breeze, with which it would be more salubrious. It is the capital of the province of Maranham, and is the seat of government, and of the bishop.

The Harbour of St. Luiz is formed by a creek in the island, and is to be entered from the bay of San Marcos, or St. Mark. The channel is of sufficient depth for common sized merchant-ships, but is very narrow, and not to be entered without a pilot. Opposite to the town, the water is shallow at the ebb. Vessels may find at Maranham the chief resources required by the exigencies of navigation. The safety of the port permits careening; the water is good and abundant, and on the island beef and rice are easily procured; but, if in want of considerable quantities, they may be most advantageously obtained on the Alcantra or continental coast, because this is, in every respect, more fertile than the island, and more abundant in cattle, fruits, &c.

The Tides are regular at St. Luiz, and in the bay of San Marcos. At the anchorage before the harbour of St. Luiz, the flood sets to the S.S.W., and the ebb N.N.E. The velocity is one mile and seven-tenths an hour, in ordinary tides; spring-tides, $2\frac{1}{2}$ miles. In the last case, the difference of level between high and low water is $16\frac{1}{2}$ feet, according to observations, made 36 hours after the full moon of January, 1820, near Fort St. Antonio. In ordinary tides, the vertical rise of water is not more than 10 feet. High water in the harbour, on the full and change, at 7h.

Sailing Directions.—Vessels arriving from Europe or the West Indies, make the coast to the eastward*; the only exceptions is with winds, at times, between the north and the west. At all other times you can see the Lancoes Grandes; this shore of white sand may be seen to commence about 20 leagues E. by S. from the Isle of St. Anna, and extends as before-mentioned, to the green or verdant land about Mangues, or Mangrove Point, under the meridian of $43^{\circ} 28' W.$ Off the coast at 4 or 5 miles from the Lancoes Grandes, are from 5 to 6 fathoms water; but, by an error of longitude, very likely to occur hereabout, you may easily mistake the Lancoes Pequenos for the Lancoes Grandes; but observe that, when off the latter, you will have the shoal grounds of the River Perguicas to the east, in place of being to the west, while off the former. To guard against all uncertainty in this respect, you must hold off to 10 or 12 miles from the coast, and continue your course

* Vessels making for the S.W., when approaching the equator, must particularly observe, that near the longitude of 41° there is a dangerous reef, the existence of which cannot be doubted, though the exact longitude is not known. On the 15th of October, 1819, the brig Richard, of Ulverstone, Captain Blaesdale, struck on this reef, as will appear from the following abstract of the Richard's log:—
 "Friday, 15th October, 1819; fine moderate weather, ship going three knots. At 6 p.m. grounded; did not remain fast above 10 minutes; water smooth, saw no breakers. In a few minutes after, sounded, but got no bottom, with 125 fathoms of line, latitude, at noon, by good observation, $0^{\circ} 57' N.$ Ran West, until 6 p.m., longitude $41^{\circ} 22' W.$ The vessel drew 11 feet water; in one hour there were 18 inches of water in the well. When the ship arrived at Para, whither she was bound, three holes were found, each about the size of a man's hat, and nearly through her bottom, and several large pieces of white coral were sticking in different parts."

from 6 to 10 fathoms, when you will be between the parallels of $2^{\circ} 15'$ and $2^{\circ} 30'$ S., on a mean direction of W.N.W., which is that of the coast.

Having arrived at the meridian of $43^{\circ} 12'$, and at 7 or 8 miles from shore, you must shape a course northward, in order to avoid the St. Anna's Breakers, which exist as before described. In this traverse, the tide will require attention, and a due allowance must be made for it, according to its direction and strength. The flood, on this part of the coast, sets to the S.W., and the ebb to the N.E., sometimes with a velocity of two miles in an hour. When past the breakers, to the north of the Isle of St. Anna, which may be known by the lighthouse, continue to steer to the West several degrees North, until you come in sight of the breakers of the Coroa Grande, which may be approached to the distance of two miles. Having passed within sight of these breakers, you will find soundings of fine sand, with black and red specks.

San Marcos, or St. Mark's Point, is the first point of Maranham, which will be seen to the southward. It is a high bluff point, and on it is a guard-house and signal-staff; from it a broad shelf extends to the S.W. of the point, with flats of rock and sand, to more than 400 fathoms from the shore, which must therefore be approached with caution. On continuing the route to the S.W. and S.W. by S., you will make the parallel of the Point das Arcas, which is the north point of the entrance of the harbour of St. Luiz. On it is the little fort named San Antonio de la Barra. This point should not be approached nearer than half a mile, at which distance are 6 and 7 fathoms, where you may anchor.

The best and most frequented route to St. Luiz is taken by gaining a sight of Mount Itacolumi, before-mentioned, situated upon the western coast of the bay of San Marcos, nearly on the parallel of the north part of Coroa Grande. On approaching this mount it appears in the shape of a gunner's quoin, and is remarkable only from the low land in its vicinity. From the lighthouse on St. Anna's Island, it bears W. $\frac{1}{4}$ N., nearly 15 leagues.

On the cliff of Mount Itacolumi is a lighthouse consisting of a quadrangular building, the sides of which face the cardinal points. The light, shown at an elevation of 147 feet above high water mark, revolves, showing a light of two colours, one being of the natural appearance and the other of a red colour, being alternately visible and invisible in each revolution. Care should be taken not to mistake this light for that on Isle Santa Anna.

When Mount Itacolumi is seen, shape a course to bring it to bear W.N.W., and, according to judgment, about 4 leagues distant; thence proceed, with the lead going, S. by W., 4 leagues, when you will have St. Mark's Point bearing South, at about $3\frac{1}{4}$ miles distant. On approaching this point, a sand-bank, dry in many parts, will be seen at about two miles N.N.E. of it; the Banca de Cerca, or Acuas Bank, to the westward, will also be seen breaking in many parts. Between these is the channel to St. Luiz Roads. On passing San Marcos Point, the rocks will be seen to the westward of it; but by giving them a sufficient berth, and bringing the body of the Isle do Medo to bear S.W., and the fort on Ponto das Areias S.E., they may anchor in 15 fathoms, sand and mud. On the foul ground, off San Marcos Point, many anchors have been lost.

The best anchorage before the mouth of the harbour is nearly a mile from Fort St. Antonio, or Ponto das Areias, with the fort bearing S.E. by E. $\frac{1}{4}$ E. In this position there are from 30 to 45 feet of water at low ebbs. Small vessels go higher up toward the bank of the Isle do Medo. The anchorage before St. Luiz is bounded on the S. and S.W. by the Ponta da Guia, Isle

do Medo, and several shoals, on which there is little water at low tides. Besides the passage on the N.E. of the bank, leading to the anchorage, there is another on the S.W., between it and the Isle do Medo, but the latter is taken only with winds between north and south by the west. The entrance of the harbour of St. Luiz is not difficult for small vessels, but those of greater draught must have a pilot. Vessels, whose draught will not allow them to anchor in St. Luiz, may anchor in the little bay of Artaki, S.W. of Maranh, having a bottom of mud or ooze, with 15 or 16 fathoms of water; the current here is less rapid than before St. Luiz, and the sea always smooth.

REMARKS ON THE PASSAGE TO MARANHAM, by Capt. the Hon. W. Wellesley:—"The best part of the coast for vessels to make is the Lancoes Grandes, or Great Sheets, because the whiteness of those sand-hills is so remarkable, and extend so far. They commence in about $42^{\circ} 45'$ W., and terminate in $42^{\circ} 12'$ W. Run holdly for the centre or western extremity, and you will probably at the same time make the green country, about the Mangues Point, with the lighthouse on Santa Anna Island, &c.

In proceeding for Maranh, it is supposed that the land is made in the morning about the Lancoes Grandes—you will be running down to near the land, probably on a W. by S. course. Having seen it clearly, haul off to W.N.W., and having arrived at their termination, you will run about 10 or 15 miles along a coast nearly green, the 'Mangues Verdes.' From the mast-head, St. Anna Lighthouse will be in sight, as you run along, bearing perhaps about S.W. by W. It will be seen before the island on which it stands, and makes like a vessel under sail. You are not sure of making the island itself, until Mangues Verdes Point bears S. by W., and it is essential to bear in mind that the light is not on the northern extremity. The dangerous shoals which run in a N.E. direction off it will now be made out, and if you think the flood is setting you in, haul off in time to N.W. by W.

The tide sets remarkably strong into the bay of San Joze. The first time I ran along the coast, it set me inside the reefs, and obliged me to anchor in 5 fathoms; and I was compelled to stand out on a N.E. course to get clear of them. The breakers, however, always show themselves. They should be rounded in not less than 14 fathoms.

Having brought these dangerous shoals abaft beam, a W. $\frac{1}{2}$ N. course may be steered with safety, until the Coroa Grande Breakers are passed. Lieut. Hewett recommends a N.W. by W. course, but I steered W. $\frac{1}{2}$ N. on the flood, in perfect safety, making the two breakers; and steering the same course upon the ebb, I was obliged to keep away W.S.W. to make them.

The Coroa Grande Shoals always break; and I think it better to make them, because you get a fresh departure, which is advantageous if night be coming on, and you wish to anchor. If you do not wish to make them, W.N.W. may be steered for 15 or 20 miles, and then West, until Itacolumi is seen ahead. The mountain is the highest land on the coast, and makes at first like a small round island; almost immediately afterwards the adjacent land appears, and then it takes something of the shape of the quoin of a gun. I think 15 miles the very utmost distance at which this land can be seen, and it is likely you will not be more than 10 or 12 miles off when it is reported from the mast-head. The less water you have the closer you will be to it.

If in approaching you should have as little as 9 fathoms, or less, haul off to the south, and gradually keep away again to the S.S.W. when you deepen the water, which course will take you up to St. Mark's Port. If on making it there should be a depth of 14 fathoms, S.S.W. may be steered at once. In

running up this course, bear in mind that the flood sets towards Alcantara, and over the Cerca Bank, and the ebb, on the contrary, will check you over to the Middle Bank, and towards the edge of the Coroa Grande.

Look out now, for St. Mark's Point ahead; it ought to bear from S. by W. $\frac{1}{4}$ W. to S.W. by S., and if you are in the centre of the channel you will hardly get soundings with the hand-lead. If you have as little as 9 or 10, you will be on the edge of the middle bank, and, as a precaution, should keep half a point or a point more to the westward; 14 fathoms is a very good depth to run up in all the way. I have had no soundings until the anchor was let go off Fort St. Antonio, in that depth.

The land about St. Mark's when first seen, makes like two small islands, the easternmost one having two sand-hills upon it, which look like two roads. The round fort and flagstaff soon appear, for which keep the ship's head, and Fort St. Antonio will be seen like a long low red house, a little to the westward of St. Mark's. When you are within a mile of this latter fort, run along the land until you bring it to bear N.E. by E., and Fort St. Antonio E.S.E., there drop your anchor in from 10 to 14 fathoms.

When near the anchorage the only danger to be apprehended in a large ship is from the Banca de Cerca, which lies about a league off shore, and the northern point of which lies about West from St. Mark's. Unless there be a very strong tide running, or the ship is beating up, you do not come near this; if you should, however, the soundings decrease very gradually, and indicate its vicinity. In beating out the pilot took the Sapphire over its north end in 5 fathoms; and at low water there may be over its centre as little as 16 feet; but of this I am not positive. It lies somewhere about north and south, and one of the marks for clearing it, is, not to shut in with Point Ataki the two small islands which lie off it.

It seldom happens that vessels have to beat from Itacolumi to Maranham, the wind being almost constantly to the eastward; but they usually have to beat out. One tide ought to bring the mount to bear from W.N.W. to West, when the pilot leaves.

They go about in from 9 to 12 fathoms on either side; twice we were off the Carnaveiros or Pirajuba Banks, which were found to extend out further than laid down. The Baron Roussin's soundings are correct, but perhaps he gives a little too much water in certain places. His details of the coast, such as the entrance to rivers, and other minutiae, are sometimes erroneous; but it must be recollected that his was a survey made under sail. The eastern channel has latterly grown up, and is now disused by all except small coasters. Having once sighted Itacolumi, it would be difficult to get a vessel into the eastern channel, so much more simple and direct is the route by the western channel."

REMARKS ON THE PASSAGE FROM ENGLAND TO MARANHAM, by Lieut. E. Stopford, commanding H.M. Schooner, Pickle.—"Vessels bound to Maranham, may cross the equator in longitude 40° W., which will enable them to fetch the Lancoes, a landfall deservedly recommended by Baron Roussin.

It has been customary to make the lighthouse on the island of Santa Anna, but an error in the longitude will be of less importance by making the Lancoes Grandes. A vessel arriving off Santa Anna, and not having sufficient daylight to find her way into the Bay of St. Mark, may lay-to for the night, off and on the lighthouse, keeping it as near south of her as possible, distant 6 or 7 miles. As there is constantly a heavy swell on the coast, anchorage should be avoided if possible, as it is both difficult and dangerous to recover the anchor.

From Santa Anna, a vessel should steer W. $\frac{1}{4}$ N., by doing which she will

pass the breakers of Coroa Grande, at the distance of about 3 miles, and Mount Itacolumi will be discovered bearing about West. When distant about 10 or 11 miles from the mount, alter the course to S. $\frac{1}{2}$ W. till the fort and flagstaff of St. Mark's are made out nearly ahead. St. Mark's Point should not be passed at a greater distance than $1\frac{1}{2}$ mile, that the Cerca Bank (on the starboard hand going in) may be avoided. A reef of rocks runs off from the point and to avoid these, it should not be approached within three-quarters of a mile. Within these limits a vessel may coast along, until Fort Antonio bears East or E. by S., when she should anchor, and wait for a pilot.

A vessel by following the above route to Maranham, will avoid getting entangled among the swashways on the Coroa Grande Shoals, which are very dangerous.

The inhabitants of Maranham, in consequence of their harbour filling up, expect to be obliged to transfer their port of shipment to Alcantara. Lieut. Stopford visited this port, and is of opinion, that it is preferable in every respect to Maranham, being easier of access, capable of containing more ships, and allowing them to get in or out at any time of tide, with the prevailing winds. The depth of water is also greater. The Pickle was anchored about one-third of a cable's length from the shore, in 7 fathoms at high water."

MARANHAM TO PARA—The coast from the Bay of Maranham to Para is generally low and sandy, but covered more or less with wood. It has many little isles of the same description, with several coves and rivulets. It is proper, when a vessel is bound from Maranham to Para, to take her departure in the morning, and advance to the anchorage off the Aracaji, or cliff before described, thence stand out to sea to beyond the Carnaverous Banks, which may be effected in a run of 8 leagues. Having passed these, you approach the sand-bank stretching from the western shore, and over which there are 6, 10, 7, 5, and 8 fathoms. Thus you may proceed to the N.N.W. or N.W. by N., to the distance of 22 leagues, when the ground of the bank, white sand, with black specks, will be succeeded by coarse sand and stones, or brown sand and broken shells, with 13 to 17 and 20 fathoms of water. Here you will be off the Island of St. Joao, and near the parallel of 1° S.

ST. JOAO, OR ST. JOHN'S ISLAND stretches N.E. and S.W., $8\frac{1}{2}$ miles. It is nearly level with the sea, and intersected with several creeks. Between the N.E. end of this island and Point Tamandua to the W.N.W., the distance is about 6 leagues. The bay between affords shelter, and vessels may anchor off the N.W. side of St. Joao Island, in from 10 to 5 fathoms, sandy ground. The Hon. W. Wellesley says, "There is anchoring ground in 9 fathoms, westward of the island, with the shoal off it E.N.E. $\frac{1}{2}$ E.; the west end S. $\frac{1}{2}$ E. There is a better anchorage at about a mile off shore, with the woody point not open of a river to the northward of it. Here the tide runs very strongly N.E. and S.W. High water about 6h. 24m. p.m."

N.W. by W. $\frac{1}{2}$ W from Tamandua Point is Cape Gurupi, distant 18 leagues, over which is a mountain, insulated, and therefore remarkable; the coast here, as in other parts, is low, level, and sandy, covered with a dark brush-wood, and from the point a shoal with breakers extends three miles out to sea. From Cape Gurupi to the River Caite the distance is 15 leagues, on a course nearly West; at the entrance of this river are several low islets; off the shore the bottom is generally flat, and there are commonly 7 and 8 fathoms, at three leagues off, with clear ground.

From the River Caite to the Inlet of Maracuno the distance. W. by N.,

is about $12\frac{1}{2}$ leagues. In sailing along it is advisable to keep two or three leagues off shore, in soundings of 7 and 8 fathoms. The coast here is distinguished by a range or chain of white sand-hills, the highest of which, Piraussu Hill, is about 18 miles westward of Caite Point; this hill appears like a high bluff and perpendicular point close to the sea with red cliffs on its eastern side. At 9 miles to the north of Piraussu Hill is point Atalaia, and immediately West of the point is the inlet or bay of Maracuno.

On Point Atalaia is a lighthouse showing a light visible 17 miles, the changes of which occur every 2 minutes in the following manner:—a steady light during 70 seconds, an eclipse during 22 seconds, a bright and short light for 12 seconds, and an eclipse during 16 seconds. It was first shown on the 8th of March, 1852.

RIO PARA.—Point Tijoca, the eastern point of the mouth of the Para, is nearly 12 leagues West from Atalaia Point, and within it, to the S.W., is Point Taipu, at the distance of $3\frac{1}{2}$ leagues. Here an extensive bank extends two leagues from shore. Between the two points, and to the northward, are the Braganza Bank and the Tijoca Shoals and breakers. The passage in is between these shoals, and has a depth of 14, 12, 11, and 15 fathoms, at about 12 miles from the southern shore, in latitude $0^{\circ} 23' S$. There is also a channel for small vessels at 6 miles from shore, and along the edge of the Coroa Nova; but to enter the river, a pilot must always be had, whichever channel may be used.

The distance from abreast of Point Tijoca to the anchorage at Para is fully 20 leagues. All the western side of the river is shoal, but on the eastern side are even soundings of 8, 7, 8, 9, 10, 7, 10, 12, 9, 7, and 6 fathoms; in the basin itself there are from 5 to 3 fathoms.

If coming from seaward, with good observations, you may cross the equator on the meridian of 45° where soundings from 50 to 40 fathoms may be found; hence a W. by S. course will lead towards Maracuno Inlet, to the eastward of which a pilot may be obtained. The soundings over the bank decrease gradually from 40 to 15 fathoms. The flood sets into Rio Para at the rate of four miles an hour; the beginning, from the eastward, is very rapid, and it veers gradually to the N.E. and North. The vertical rise is 10 feet.

Ships outward bound from Point Taipu should steer according to the tide, keeping that point about S.E., until distant from it 15 or 16 miles; but you must keep the lead going to avoid the Caroa Kiriri and other shoals which are dangerous. Cape Magoari will then be in sight, and you should haul up N.E. or N.N.E., taking care to avoid the Shoals of St. Rosa. The winds are generally from the eastward, and blow in squalls. The beginning of the flood sets from the eastward very rapid, and veers gradually to the N.E. and North. In thick weather, when Cape Magoari cannot be seen, you may discover your approach to the Banks of St. Rosa, by the soundings becoming irregular, which is not the case to the eastward of the channel. Keep the weather shoals on board as much as possible.

Whoever is bound to Maranham or Para should make the land in the months from December to July, because high winds seldom prevail, and the shores then appear clear and bright; but from July to November a constant fog envelopes the land, and the higher the tempests, the thicker and more hazy the atmosphere appears. The winds most prevalent on this coast are the N.E., E.N.E., and East, which are all fair for going in or out of Maranham and Para.

REMARKS on the passage from Maranham to San Joao, Salinas, and Para, by CAPTAIN THE HON. W. WELLESLEY.—“On leaving Maranham, for San Joao

Island, I steered N. and N. by W, until nearly on its parallel, when, hauling in to the westward, I made the eastern part. The land here may be known by a small white patch, of exactly the same colour as the Lancoes Grandes. It is very remarkable, for the surrounding country has verdure about it, and the sand is whiter, and has altogether a different appearance. At these Lancoes is the narrow passage between San Joao and the main. The eastern or north-eastern is pretty bold; I approached it to about 4 miles, and it being calm, and a strong tide running, I anchored in $9\frac{1}{2}$ fathoms.

Continuing along, you lose sight of the Lancoes, and arrive at the eastern point, which is low, sandy, and has a shoal off it, which always breaks; I rounded this in 10 fathoms. On approaching it, over the sandy ground, a green and woody point appears, which has a peculiar shape, from the trees at its extremity being withered or stunted; it seemed to me, at first sight, as if a mist were coming over the land. I am thus particular, because the sight of this point, or rather the certainty of it, is requisite to take up a good anchorage. It should not be brought to bear to the southward of East; and you should not open a river, the entrance of which is just to the southward of it. But the best anchorage by far, is to round the breakers in 10 fathoms, and anchor at about a mile from the shore, in not less than 8 fathoms, and tolerably close to them.

I would here warn future navigators, who are making the coast, or leaving Maranham for the coast to the westward, to choose 3 or 4 days after the full or change of the moon for the time of starting, as the tide runs so very strong. In the Sapphire it happened that we entered this anchorage during their greatest strength, and upon the flood. Many of the shoals only shew upon the ebb. We were driven upon their edge, and anchored in 7 fathoms, supposing ourselves in a safe position. When the tide turned, breakers were discovered within 20 yards of us; and it is probable, had not the wind and tide favoured us, we might not have got clear without difficulty. The tide was found running full 4 knots.

Having been once at San Joao I should have no hesitation in taking the ship in again; but I would do it with the ebb tide, and, if possible, the quartering of the moon.

Fresh beef may be procured in abundance at the hut to the southward, where dwells a Brazilian to take care of a quantity of cattle, the proprietor of which lives on the main land. The best landing is just round the south point. You may also land at Woody Point and cut fuel; but if you remain there during the flood, you will hardly pull through the entrance of the river, the tide runs in so violently. I did not see any fresh water: that which divides the island into so many parts is brackish.

From St. John's to Salinas the land is low. I steered N.W. by W. and N.W., until I had passed Cape Gurupi, off which extends a shoal of 3 miles, or, as some say, more. I am given to understand that this bay is not so deep as laid down in the charts, and that vessels mostly anchor off the shoals. There are generally a number of troops at Gurassi, and sometimes a Brazilian man-of-war. Diamond mines are in the neighbourhood.

From 13 to 15 fathoms is a good bottom to run along the coast in; at this depth you are always well off the land. Whenever I ran in with the land the soundings were found to decrease very gradually to 12, 11, and 10 fathoms. We had the wind at north, which enabled us to lie off the land.

Until I arrived at Mount Atalia, the only points I distinctly made out were Caite, which is a long, low, green point, and Mount Piraussu, which may be *known by the red cliffs about*; but you must be pretty close in to make the *red out clearly*. The directions in an old book say that Mount Atalia has a

watch-tower upon it, with a gun, which is sometimes fired, when a vessel is seen approaching. This is not the case at present, whatever it might have been formerly, I have heard there is an old unroofed building standing, but I could not see it at three miles distance: this is essential to know, as, running down the coast without a pilot, one naturally looks for what is said to be a guide for Salinas.

Mount Atalia is rather a high point,—with reference to the land around it, and there are two or three remarkable patches of land on it; and to the eastward, between it and Point Caite, coming from seaward, it makes very distinctly;—the point and white patches cannot be mistaken. From the eastward its extremity makes like an island, and a white patch and point, about 8 miles from it, might be mistaken for the mount itself. I anchored off this patch in 10 fathoms.

Running any distance, at 5 or 6 miles from the shore, Salinas, the pilots' station, is difficult to make.* As you open the land to the westward of Atalia, looking carefully, a small white house will be discovered, with a red streak behind it. The white house is the chapel, and the red the tiled roofs of the cottages. It stands upon ground rather greener than the surrounding country. I observed it to make better coming more directly from the northward the whole village presenting a larger appearance. The best anchorage is with it bearing from S. by E. to S.E. by E., in from 7 to 13 fathoms of water. In the Sapphire we anchored with it bearing S. by W., (off a spit which runs off Atalia) in 7 fathoms; but the ground is foul at this anchorage.† In sending a boat ashore, the best passage in is between two breakers, a little to the westward of the village; opposite to it is a very heavy surf.

From Salinas a W.N.W. course leads you clear out to Maranduba, which is a sandy point. We kept away afterwards to W. by N., and then to West, running in from 7 to 13 fathoms; and, when Point Curucu (a low green point, which came in sight when Maranduba was on our beam) bore South, we saw the Braganza Breakers. They always shew themselves, and you may run round them by your eye, in 9 or 10 fathoms. In rounding them, we kept gradually away from W. by S. to S.W., and then to S.W. $\frac{1}{4}$ S. and S.W. by S., to run up the river. In running up, Point Taipu should be noticed, with a small islet off it, as it is from this point that a departure is taken by the pilots on leaving the river.

Bahia do Sol and that of St. Antonio are the places preferred by the pilots, for anchorages, going up or down. At other parts you are not so safe, being

* The pilot signals at the village of Salina, in 1832, were as follow:—

1. A flag hoisted on the flag staff, is the day signal that a pilot may be obtained.
2. If the pilot should not, however, come off during the day, and at night there be shown two lights, the pilot may be expected off the following morning.
3. If there be three lights shown, the pilot has no boat, and must have one from the vessel to bring him off; in which case the vessel must bring the village of Salina to bear S.S.W., in soundings of 5 or 6 fathoms of water, when Point Atalaya (improperly called Atasia) will be distant about 5 miles you may hence dispatch a boat, well manned, which must keep close in with the shore of Atalaya, clear of the surf, until it meets with an opening in the reef, which lines the coast in front of the village, through which it must pass. Inside the reef the water is quite smooth, and you may land anywhere upon the beach.
4. The boat should be sent at half-flood, in order that it may return the same tide. It is high water here, on the full and change, at 7 o'clock, and off shore at 8.—LIEUT. E. STOPFORD.

† From this anchorage Salina bore, S. by W. $\frac{1}{4}$ W.; Macnassani, W.S.W.; Point Atasia, nearly South. The best anchorage is with the pilot's station S.E., in from 9 to 13 fathoms, and not less than 4 miles from the shore.

very liable, owing to the foul bottom and ground swell, to lose your anchor, or snap your cable. The same observation applies to the coast in general. It is better, if there be sea-room, to stand off and on, than to run any of these risks. Off Para, it is better to anchor close to the town; the nearer you are the deeper the water. The tide runs very strong; but, the water being shoal, 30 fathoms on each chain is enough to moor. The large mooring swivel supplied to Her Majesty's ships is recommended to be used.

Fresh water is procured alongside, which is of a very good taste; but, being somewhat dirty, or rather muddy, it should be strained through bunting, in running into the tanks.

On leaving the River Para the western channel is, in this case, most commonly used. Having brought Point Taipu to bear from S. by E. $\frac{1}{4}$ E. to S.S.E. the pilots steer North which takes you out clear of all the shoals. When you are clear pursue a North course, if possible, and you need think no more of the coast; but if the wind is foul, no immediate danger need be apprehended at from N.N.W. to N.E.; but, in this event, it will be better to anchor should the wind be light, and the flood-tide running. On leaving Para you may expect a strong northerly current, until you attain the meridian of Cape North. It set the Sapphire, for two days, at the rate of $1\frac{1}{4}$ mile an hour. Afterwards she experienced even a stronger westerly one, against which precautions should be taken, if a course be steering for the West Indies."—*Nautical Magazine for 1833, page 499.*

Captain Courtnay, R. N., represents the bottom, along the whole line of coast, as being composed of quick-sands, to which he attributes the frequent loss of anchors by vessels. Lieut. Stopford is of a different opinion, having frequently anchored on all parts of the coast, between Maranham and Para. It is, however, indispensable that vessels should ascertain the quality of the bottom, before anchoring, as it is foul in many places. The Pickle lost her small bower, before Lieut. Stopford was aware of this, by anchoring on rocky ground. Vessels should be careful not to anchor off St. Mark's Point, as the ground is foul, and many anchors have been lost there.

REMARKS BY LIEUT. STOPFORD, of *H.M. Schooner, Pickle*, 1832.—"A vessel bound from Maranham to Para, during the rainy season, should get to the northward of the equator, as soon as possible; she will thus avoid the light baffling winds and calms which prevail in this season, and also the current, which sets from E.N.E. to S.E. about 2 or 3 miles per hour, occasioned by the water from the various rivers and bays of the coast.

To the westward of the Island of Salinas there are some white cliffs, so nearly resembling those to the eastward of that island that they have frequently been mistaken for each other. Vessels, mistaking the western cliffs for those east of Salinas, have stood on until they have been lost on the Braganza Shoal, or in that equally dangerous place, named the Well. Lieut. Stopford has been informed that nearly all the losses that have occurred, at the mouth of the Amazon, have arisen from this cause. The utmost caution is therefore necessary to attend to the following directions for anchoring at Salinas;—bring the town of Salinas to bear S. by E. and anchor in 9 fathoms. The whole coast from Turivazo is woody, and the white sand-hills are very remarkable.

H.M.S. Pickle remained at anchor one night, in 7 fathoms, with the town bearing S. by E., and had no difficulty in regaining her anchor in the morning. Lieut. Stopford observes, that accidents frequently happened, and lives have been lost, by boats, going for pilots, being swamped in the surf. They have frequently landed immediately under the town which is

very wrong ; and Lieut. Stopford recommends them to pass to the west of the island, where boats may land in safety, and thereby avoid the surf outside."

DIRECTIONS FOR VESSELS BOUND TO THE RIVER PARA, BY CAPT. R. THOMAS, of the *Brig Margaret Richardson*, of *Glasgow*.—"When bound to Para, from the northward, vessels should cross the equator in 46° W., then steer S.W. until they arrive in $0^{\circ} 28'$ S.; soundings may then be found in 17 and 20 fathoms, fine sand, with small specks. Steer a West course from thence, keeping the lead going, and do not approach the shore nearer than in 12 fathoms water. White sand-hills, to the westward of the Bay of Caite, will soon be seen, appearing from the mast-head like breakers, at the foot of high mangrove trees. The land of Caite must not be approached, for the water is very shallow, and the soundings very irregular off this bay; and the flood tide sets in to the west. By steering a West Course, and keeping a good look-out, Point Atalia will soon be seen; it is the highest land on the coast from Mount Gurupi, with steep red cliffs at the end and to the westward of it.

About two miles farther to the westward is the village of Salinas. The pilot-station is situated on a steep cliff, and the houses covered with red tiles. Near the middle of the village a church, with the steeple may be seen.

Abreast of this point, distant from it about two miles is a bank of hard sand and stones, with $4\frac{1}{2}$, 5, and 6 fathoms water; this bank extends to the eastward as far as Caite, and the west end bears South from Salinas. Within this bank is a channel with 9, 10, and 11 fathoms water, soft mud, but, being so near the shore, I would not recommend it.

After having reached Salinas, the pilot-station, should the weather be fine, and light winds, I would advise anchoring with the village to bear S.E., and not in less than 9 fathoms; for should it come to blow, during the night, which is often the case in the rainy season, and a vessel should part her cable, she will have sufficient room to make sail, and stand to the northward under easy sail, until morning; and, by that means, will avoid the reef which lies off the island of Praia Grande, the nearest island west of Salinas. Should it be blowing strong, on arriving off the pilot-station, and past noon, I would recommend a vessel to lie off and on, under easy sail, until next morning, for it would be too late to attempt to run for the banks.

In leaving Point Atalia, for Para River, I recommend making sail early in the morning, steering W. by N. $\frac{1}{4}$ N., keeping the lead going, and being very cautious in steering and sounding, as the tides here run very strong, and are very uncertain in their direction, owing to the many small rivers and banks adjacent. A vessel should not come nearer the shore than 10 or 11 fathoms, until she comes abreast of Maranduba, or what some call False Salinas. It is the second island after passing the village, with two white patches, or sand-hills, much resembling, in appearance, the sand-hills to the eastward, but smaller.

These two sand-hills have been mistaken by strangers, and have proved fatal to many valuable lives, for there is no landing in their vicinity. It was off here that the brig *Warrior*, Captain Manse, in 1827, unfortunately lost his mate and three men, by the swamping of the jolly-boat, in attempting to reach the shore in search of a pilot. Having passed these sand-hills, continue a course towards the Braganza Banks, or breakers, still keeping the lead going.

From thence to the banks, while in the fairway, 13, 15, and 17 fathoms will be found; and when these sand-hills bear about S.E. by E., the breaker

will be seen from the mast-head, on the port bow. These breakers must be left on the port hand, about half a mile distant. The channel here, between the Braganza Banks and Tijoca Shoals, on your starboard hand, is not two miles wide. Having reached the breakers, which is the only guide for entering the river, a vessel may steer a little more southerly, keeping the lead going, for she will then have 15 fathoms, foul ground, in mid-channel; having got well round these breakers steer a S.W. $\frac{1}{4}$ S. course up the river, keeping the port shore on board.

The foregoing directions are the result of my experience in 17 voyages that I have made to Para. I never once saw the tower on Point Atalia, and the opinion that a gun is fired when a vessel approaches it, is quite erroneous."

GENERAL REMARKS ON LEAVING MARANHAM AND RETURNING TO EUROPE.—In leaving the Port of Maranham, and proceeding northward, a favourable wind is required; and care must be taken, in order to avoid the dangerous shoal of Manoel Luiz, hereafter described. The combination of tide and current hereabout, renders it necessary to be very circumspect when leaving the bay, or in sailing between it and the shoal of Manoel Luiz, as the streams may be variable. In supposing the winds to be to the East, N.E. to E.S.E., which are most frequent, you must take the starboard tack on quitting the roads, and then endeavour to steer so as to make good the route of N. $\frac{1}{4}$ W.

It is necessary to get under-way at the precise moment of high water, so that the first tack may carry you clear of the Cerca Bank,—an approach to which may be known by a sudden change of depth, from 15 to 16 fathoms to 8, and even 5 fathoms, in the interval of time required for heaving out and drawing in the lead. The Cerca Bank is narrow, situate in a N.E. and S.W. direction. When on the northern extremity, in 9 feet, at low water, the eastern side of the northern islet, Espera, appears in a line with Point Ataki, and the Point of St. Mark, S. 56° E. Beyond this, the first tack, towards the west, may continue, according to the wind and the tide, the ebb being still favourable. The latter sets to the North and N.N.E. in all the extent of the bay; and one ebb may suffice for carrying the vessel out, provided it be taken, as before mentioned, from the moment of high water. Small vessels may approach the coast, on the west, to the distance of 2 or 3 miles; but it is not prudent for large vessels to advance so near, or in less than 12 fathoms.

Having completed the tack to the depths described, and hauled to the eastward, the depths will be found to increase, and probably the second tack to the north will accomplish the passage outward; but, should it be otherwise, continue to tack while the ebb continues, never lessening the depth under 12 fathoms, and taking every precaution not to approach too near the middle bank, which is steep-to. The rapidity of the stream will be found proportionate to the depths; and the middle of the channel being deeper than the sides, it is consequently in mid-channel that the tide is most favourable.

Should the winds blow from the S.E. or S.W. quarters, at the moment of departure, the most convenient route will be along the Maranham side and the bank of the Coroa Grande; but the channel to the eastward of the middle bank requires caution. The leading mark to clear the eastern side of this bank is the tower of San Marcos S.S.W. $\frac{1}{4}$ W., until the Morro, or Mount Itacolumi, bears N.W. by W. $\frac{1}{4}$ W., when you will be clear of its north end, *and may proceed according to circumstances.* The pilot employed in con-

ducting vessels outward is generally discharged at 2 or 3 leagues to the eastward of Mount Itacolumi.

Shoal of Manoel Luiz.—The only obstacle to be feared and avoided, on the route to the northward, is this dangerous shoal, which lies in the true direction of N. 8° E., nearly 26 leagues from Point Itacolumi. Baron Roussin was the first that explored and ascertained its position, in 1820, and found it to consist in several groups of conical rocks, even with the water, situate in a sea rarely exposed to violent winds: this reef breaks only in short intervals, and at low water. It is, therefore, almost impossible to see it, unless when passing very near. Nevertheless, several rocks of the flat have over them not more than from 5 to 15 feet of water, with 8, 10, and 12 fathoms at their base. After two hours' flood, and only at half a mile off, with the sea smooth, no trace of them will be seen. This reef, which lies 0° 1' 30" east of St. Luiz, off Maranham, is more than half a mile from north to south, and about three miles in an E. by S. and W. by N. direction. Should a vessel strike upon it she would, most probably, go down immediately.*

By anchoring for 30 hours, near the edge of the shoal, Roussin found that the tide set regularly 6 hours each day; the flood to the S.W., and the ebb to the N.E., nearly with the same strength—six-tenths of a mile an hour. High water, at full and change, at 5h. The rise and fall was 12 feet.

Captain G. Chevely examined this shoal on the 8th of December, 1828, during a fine steady breeze, nearly East, and clear weather, and says, "The appearance of the reef, on approaching, is only that of a heavy sea or rollers, hardly breaking in calm weather, and consequently the more dangerous. It is very steep, rugged, and composed chiefly of detached coral rocks. The shoalest part appears to have about 6 feet water over it, the sea breaking as it were through gaps, or little channels, under water. The extent seemed to be about 1½ mile from east to west, and from half to three-quarters of a mile north and south."

VIGIA.—Baron Roussin says, that, in 1825, he was apprised of the existence of a group of rocks, said to have been discovered by M. da Sylva, an officer of the Brazilian Marine, and he enters largely into the question whether these may not be those of Manoel Luiz. The position assigned to the Vigia, of M. da Sylva, is 0° 32' S. and 40° 17' W., and consequently lies, according to this account, 7 leagues to the northward of that of Manoel Luiz.

THE EAST COAST OF BRAZIL.

Resuming our direction at Cape St. Roque, we proceed to describe the eastern coast of Brazil towards Rio Janeiro. Cape St. Roque, as before stated, is the N.E. extremity of Brazil, and is readily distinguished by its red cliffs, from which it derives its name.

The appearance of the eastern coast of Brazil, between Cape St. Roque and the Isle of St. Catherine, varies considerably. In the southern parallels, from the Isle of St. Catherine to nearly 60 leagues to the northward of Cape Frio, the lands are very high and woody, and in clear weather, may be seen 18 leagues off. On coming in from sea the coast may be safely approached, with the ordinary precautions; but this is not the case in other parts. Farther to the north the land declines in height, and can be seen at a moderate distance only; it must therefore be approached with caution.

The warnings, which may be acquired by soundings, in the proximity of

* On the 21st of May, 1814, the ship *Venus*, of Liverpool, unfortunately experienced this misfortune, and disappeared in about 15 minutes: the utmost precaution therefore is necessary.

land to which you may be approaching, depend on the part you may be on. These warnings, may be of little service on the eastern coast, particularly between the Isle of St. Catherine and Olinda, as the bank of soundings extends to no long distance, and great depths prevail on its outer edges; the parallel of the rocks named the Abrolhos excepted. Between the parallels of 21° and 22° S. the depths vary from 40 to 17 fathoms, 12 leagues from shore; at 30 leagues East from Cape St. Thome, there are more than 100 fathoms. Soundings extend more to the East and S.E. of the Abrolhos, though but little to the eastward of the meridian of $37^{\circ} 10'$, which is 27 leagues to the east of these islets; and beyond this there is shortly no ground at 190 fathoms.

At only 8 leagues to the S.E. of Cape St. Antonio of Bahia, no bottom is found at 180 fathoms; but south of this cape, at 9 miles distant, there are 28 fathoms of water. Again, at 9 leagues, on the parallel of the Morro of St. Paulo, with the Morro in sight to the West, there is no bottom at the depth of 50 fathoms.

From Bahia to Olinda the bank is generally steep; at 9 leagues to the East of the Tower of Garcia da Vila the depth is not less than 160 fathoms; at the same distance to the East of the inlet Itapicuru the depth is 180 fathoms; it exceeds 170 fathoms at 20 leagues from Rio Real and Rio Sergipe, and it is found to be nearly 50 fathoms at 10 leagues to the eastward of the mouth of the Rio S. Francisco. Finally, on all the coast, nearly to Pernambuco, there is found not less than 30 to 40 fathoms at 9 leagues from shore; and at less than double this distance, on the parallels of Pernambuco and Olinda, there is not a depth of less than 110 fathoms. To the northward of the parallel of Olinda the depth comparatively lessens, but it is again very great at a little distance from the land. At 2 or 3 miles from Cape Branco, before the mouth of the River Parahyba, and before the Fort dos Reis Magos, or mouth of the Pontangi, there are found from 6 to 9 fathoms only; the same at 4 miles off from Cape St. Roque, deepening quickly to 40 fathoms, and thence continuing an increase to 10 or 12 leagues from the coast. Hence it appears that on a great part of the line of coast, between the Isle of St. Catherine and Cape St. Roque, the depths are, in general, either too great or too uniform to serve as a guidance, or to suffice for correcting an estimation of the route to any particular spot. But it is not to be understood that it is useless to sound on the coast; only observing that too much dependance should not be placed on the soundings, at any distance from shore.

NATAL.—This city is situated on the N.E. bank of the Rio Grande do Norte, or Pontangi of the aborigines, a rapid river in the rainy season, but in the dry season it is much reduced; the channel to this river is protected by the Recife, both on the north and south. It appears that the ends of the two portions of the Recife, forming the entrance, are nearly on a true East and West line from each other; so that the channel-way faces the North, while the reefs are nearly in the same direction. The distance between the two extremities is about two cables' length, and the depths $3\frac{1}{2}$ to 6 fathoms, the depths within, and up to the town, 4 to 6 fathoms; but there are shoal banks within the reefs, on both sides, while the mid-channel is clear. A round fort, named the Fort dos Reis Magos, stands on the middle of the southern reef at the entrance; it is insulated at high water, but may be seen several miles off, and is the best mark. To enter the river, keep a fort on the main land, within the entrance, open of the extremity of the southern reef until the round fort on that is seen from the inside of it, bearing about S. $\frac{1}{2}$ E., then *run in S. $\frac{1}{2}$ W. till the fort on the main bears W. $\frac{1}{4}$ S., and steer for it; when*

within two-thirds of a cable from it, proceed towards a white house on the same side, and then directly for the town, in mid-channel, keeping over to the eastern shore, as there is a shoal bank all the way up on the opposite side. The town is about $2\frac{1}{2}$ miles from the entrance, and there the breadth of the river is three-tenths of a mile, with an increasing depth of water.

To the southward of the Rio Grande is the Ponta Negra, distant 6 leagues. Several miles to the North of this are some red cliffs, named by the pilots, the Barriers of Hell (*Barreiras de Inferno*), and which extend in the direction of North, at some distance from shore; a rivulet falls at the foot of them, through an opening in the Recife, before which breakers extend to about a mile. Bahia Fermosa, or Fair Bay, is nearly two leagues in extent, from north to south, and has, in the middle, 4 fathoms at low water; but having much foul ground, patches of coral with some rocks, and being open to the sea, is not safe anchorage. The Ponta da Pipa, between Bahia Fermosa and Ponta Negra, is a rock on the point of land, upon which the sea breaks. To the N.W. of it are two villages.

Nine leagues to the southward of Bahia Fermosa is Bahia Traizao, or Treason Bay: it has been, heretofore, described as the best anchorage on this part of the coast; but it is only a small cove, and offers no shelter against winds from between North and South by the East. To the northward of the Bahia Traizao the coast presents a continuous line of downs of white sand, covered at intervals with bushes. To the southward of the Bahia Traizao is the little River Mananguape, distant 3 miles; between are several small reddish cliffs. The river is navigable by the coasters only; its South point is of sand, woody, very low, and it projects to the N. by E., terminating in breakers, on the North side of which is the entrance.

RIO PARAHYBA.—This river may easily be found by making Cape Branco, which lies 10 miles to the southward. This cape is a projecting headland, having a steep cliffy shore of white sand. Two remarkable cocoa-nut trees mark the extremity of the cape. From off Cape Branco the country to the N.W. appears like two plains, which, on approaching, become distinctly marked. The outer one, by the sea, is low and sandy, but woody in the higher part. The River Parahyba flows between the two plains, and its direction is S S.W. from its mouth. The South point of the mouth of the Parahyba is low, sandy, and woody, and forms the extremity of the first plain, before noticed; the barrier reef extends in front of this plain, at the distance of nearly half a mile. The North point is formed, on the second plain, by a more elevated coast, and on it are some cocoa-nut trees. On the height, to the N.W., is the conspicuous convent of Nossa Senhora de Guia. Extensive breakers indicate the mouth of the river; in front of which, at the distance of 3 miles, there are 10 fathoms of water. Of the two points which form the outer entrance of the river, that on the south is named Ponta Balea, and that on the north Ponta Lucena; these points bear from each other N.N.W. and S.S.E., $3\frac{1}{2}$ miles, and both are distinguished by extensive breakers. On the shore within Ponta Balea is Fort Cabedello, which may be seen from the offing, and it serves as a point of recognition for the low and even coast, which is destitute of other buildings. The bar is shoal and dangerous, and its best water, at low tide, is $2\frac{1}{2}$ fathoms. Vessels of 150 to 200 tons cannot proceed much above Cabedello Fort, but small vessels go up to the town. Pilots come off and bring vessels to a roadstead off the fort, in order to be visited. The City of Parahyba is about 4 leagues from the sea, but the sinuosities of the river make the distance 6 leagues.

REMARKS on the Harbour and River of Paraiba do Norte, by Commander the Hon. F. F. DE Roos, R.N.: The River Paraoba do Norte, which is situated

67 miles North of Pernambuco, has an extensive commerce, and is generally visited by ships homeward-bound from that port, to complete their cargoes. Vessels drawing $16\frac{1}{2}$ feet can safely enter at the springs.

The coast here trends North and South, and the direction of the river is S.S.W nearly in a straight line. On the South point (Balea) of the entrance, which is low, sandy, and wooded, is built the strong fortress of Cabedello. The North point is also low, with cocoa-nut trees upon it; but immediately behind is some high wooded land, on the point of which the remarkable Convent da Guia is distinctly seen. The barrier reef terminates abreast of the South point, when the bar commences, and continues until it reaches the extensive shoals which stretch out from Point Lucena.

Ships approaching from the South are recommended to make Cape Branco, which is 4 leagues South of Cabedello. It is a remarkable point, with two cocoa-nut trees on the very extremity. From the Northward the latitude may be run down, when Cabedello Fort will appear. It is the only fortress for many leagues upon the coast, which otherwise bears a great sameness of appearance. Ships should on no account venture into less than 6 fathoms water.

A gun fired will bring off a pilot: they come in jangadoes from the Coco village to the South of the Fort, and are considered expert and trustworthy.

The bar is at some distance from the land, and, as the passage is tortuous, it is not safe to enter without a pilot. On it there are 8 feet water at low water spring-tides,

The bottom is sand, in some spots hard. There are breakers on either hand, and the marks which are given are difficult to distinguish, and therefore not to be depended upon.

The land winds are not of frequent occurrence. Vessels, therefore, have generally to beat out against the prevailing N.E. wind, which blows steadily. H.M. sloop *Algerine*, working out in October, 1832, made twenty-one tacks.

It is usual for all ships entering to anchor off the Fort Cabedello, in order to be visited: after this they are at liberty to proceed up the river. H.M. sloop *Algerine*, was anchored with the Fort bearing, by compass, S. 60° E., distant a quarter of a mile, in $5\frac{1}{2}$ fathoms. Bad water and few supplies are to be found at this place.

A different pilot is appointed to take vessels up the river, which, as the wind is generally fair, is an operation of little difficulty and danger, and is almost always affected in one tide. The two shoalest spots are situated, one just above Cabedello, and the other abreast of the entrance of the Tambia River. Going down is tedious, as ships have beating winds, but the reaches are long. The bottom throughout is soft mud.

It is necessary to warp into the anchorage off the city, which is perfectly sheltered and secure. Indeed, the only vessel ever lost in the river was one, which, by inadvertence, grounded upon her anchor, and foundered.

Water is to be procured by sending boats with casks up the rivers: that of the Tambia is celebrated for its purity. Provisions may be had in abundance, and at a very moderate rate.

We had no opportunity of ascertaining the latitude of Cabedello, but have assumed it, after Baron Roussin, to be $6^{\circ} 57' 50''$ S. The difference of longitude, measured from Cabedello to the lighthouse of Pernambuco, by three good chronometers, makes 5s. 9, or $1' 28''$. 5 to the eastward, which, allowing that place to be in $34^{\circ} 51'$, gives the longitude of Cabedello $34^{\circ} 50', 5$. The variation of the compass we observed to be $5^{\circ} 14'$ W. High water, on

the full and change, at 5h. ; springs rise 12 feet. The land-breeze is seldom experienced here."

Four leagues to the southward of Cape Branco is the Porto dos Francezes, which affords occasional anchorage for ships, but on bad ground. Hence, southward, the recife continues to the River Capibarami, or Goyanna River; the bar of this river lies nearly midway between Coqueiros, or Cocoa-tree Point, and Ponta de Pedras, or Rock Point. Here the outer reefs extend to nearly a league from the bar, and it is said that vessels of 40 tons may proceed as far. The Points Coqueiros and Pedras are nearly on the meridian of $34^{\circ} 47'$, and they are the easternmost points of Brazil.

ITAMARCA.—This island lies parallel to the main, nearly North and South, and is about 8 miles long; it has good water and an excellent harbour, the principal entrance to which is south of the island; here vessels of 300 tons may safely go over the bar, but you must have a fair wind for that purpose, on account of the narrowness of the channel, which is, in some places, not a musket-shot wide, and at this narrowest part is a shoal having, at low water spring-tides, only $2\frac{1}{4}$ fathoms over it; but, having passed this bank, your water deepens, and you may ride in perfect safety. The bar has 3 fathoms over it, with spring-tides, and the rise of water is about $1\frac{1}{2}$ fathom; from the bar to the anchorage the distance is one league. The channel at the northern end of the island is named Barra, or Entrance of Catuama: this is a shallow and difficult channel, which admits nothing larger than boats and small craft, although in some parts, there are more than 3 fathoms at high water.

PAO AMARELLO, OR YELLOW-WOOD RIVER.—This little harbour is formed by a break in the Recife, which here runs parallel to the shore, both to the northward and southward. There is a depth of 3 fathoms near the entrance; but, though there is room enough for vessels to anchor, it is unsafe, being between the reef and the shore, in a narrow channel, and being always necessary to have anchors out, one on the reef, and the other on land, to prevent the ship swinging with the tide. On approaching to the Amarello you may see, on the beach, a small battery. Vessels drawing 6 or 7 feet water, which enter here, may proceed with high water, hence to Pernambuco, by passing within the Recife and Banks of Olinda.

The shore, between this place and Itamarca, is composed of woody hills, cultivated, and separated from the sea by a beach of white sand, at 2 or 3 miles from which you may find from 10 to 14 fathoms of water, bottom of sand and gravel. The coast hence southward to Olinda increases in height, and may be seen at a distance of 5 leagues.

PERNAMBUCO AND OLINDA.—These are places of great trade. It will be seen, from what has already been written, as well as from an inspection of the chart, that the navigation of this whole coast of the Brazils is encumbered with, and rendered dangerous by, numerous rocky reefs; and the mariner who is coming from the northward, and bound to Pernambuco, should be particularly careful to give the Point of Olinda a berth of full 3 miles, coming not into less than 10 fathoms water; for, should he approach nearer to the land, he will find his soundings extremely irregular, and the surrounding reefs in many parts steep and dangerous. About $3\frac{1}{4}$ miles S.W. by S. from Olinda Point lies the little bar of Pernambuco, where, on the northern extremity of the Recife, or reef, stands Fort Picao, an octagonal tower, with 7 guns; and, on the opposite side, Fort Bruno, between which, over the bar, are 9 and 10 feet water. One mile and a quarter, E. by N., from Fort Picao lies the *Englishman's Bank*, stretching, from North to South, three-quarters of a mile, and from East to West, about half a mile: this is rocky, composed of hard concreted stones and shells, and has over its shoalest part

only 2 fathoms. The marks for it are a large cocoa-nut tree, distinguishable from all parts of the bay, and situated between the two highest buildings on the hill above Olinda, in one with a kind of jetty on the beach immediately under that town, and bearing N. $\frac{1}{2}$ E. The cross bearing for the southern extremity must be taken by compass, the Picao tower due West. Between this bank and the Basin, or Well, is a passage of 5 fathoms, and nearly half a mile in breadth.*

Small vessels run over the Bar of Picao, named also the Little Bar, which has 10 feet on it. The marks for it are, the two turrets of the southern angle of Fort Bruno in one. Large ships discharge and take in their cargoes in a basin, named the Poço, or Well, immediately at the head of the reef, and outside the harbour. The entrance to the latter is between some detached rocks, apparently a continuation of the reef, named the Great Bay. It has on it 17 feet of water, increasing to 20 within, when the vessels moor. The inner, northern, and southern sides, are formed by the gradual decrease of depth toward the shore, and are sandy.

In the offing the bottom is composed of fine white sand; but, nearer the coast, numerous patches of coral are interspersed, dangerous to cables. The best anchorage for men-of-war, is with Olinda North, and the Picao Tower N.W., in 6 fathoms; as this is the only spot in the bay, near the town of Pernambuco, where they can lie, without the danger of parting in the space of three or four days.

The *Lighthouse* at the entrance of the harbour stands about 50 yards from Fort Picao, on the point of the reef. The tower is octagonal and painted white. It stands on a rock, which is covered at one quarter flood; the lantern exhibits three lights in succession, from sunset to sunrise, of which two are brilliant and the other red: these make one complete revolution in every two minutes, and may be seen from the mast-head, in clear weather, 20 miles off.

CAPE ST. AUGUSTINE is a high rugged projection, easily known by its red cliffs, with a church and barn on its summit. It has also, on its eastern extremity, a battery mounting five guns, which is difficult to be distinguished at any considerable distance. By giving Cape St. Augustine an offing of 6 or 7 miles, when bound to Pernambuco from the southward, and steering a N. by E. course, you will soon gain a sight of the city of Olinda ahead, situated on the northern extremity of the bight which contains the Harbour and Road of Pernambuco. The city stands, principally, on the southern declivity of a pleasant hill; and when the highest buildings are well in sight, Pernambuco will be seen to the southward of them, the site being low and sandy.

The following directions for Pernambuco, &c., are taken from the Pilote du Brazil of the Baron Roussin.—"The true bearing and distance of Cape St. Augustine, from the point of Olinda, is S. 17° W. (by compass S. 21° W.), distant 21 miles. Cape St. Augustine is the landfall generally made, when

* The following notice was issued on the 11th of April, 1850:—"There are now moored to the east of the lighthouse of the Bar of Pernambuco two buoys, one black and the other red, which show the position of the English Bank. Each of these buoys has a bell to warn incautious navigators of its proximity; but, in consequence of the direction of the winds, and the roaring of the waves, it sometimes cannot be heard except at a short distance. The red buoy marks the southern end of the said bank, and the black one the northern extremity thereof.

To the eastward of the said buoys you can always safely steer, but only at high water in middle tides can vessels drawing 10 feet pass between them.

To the southward of the red buoy the navigation is always free and open to any vessel, but to the northward of the black buoy there is barely a channel by which vessels can pass, having bar-pilots on board, as close to are the Olinda Reefs or Banks."

bound for Pernambuco, during the southern monsoon. The coast to the north of this declines half a league to the west, and forms a slender bay; at 17 miles northward from the cape is the city of Pernambuco. The middle of this coast is marked by the chapel of *Nossa Senhora do Rosario*, built on an elevation about half a league inland, and having two towers or steeples, which facilitate a knowledge of the place, on coming in from sea. The shore is low and covered with trees, nearly as far as Pernambuco; and, in coasting along shore, at from 2 to 4 miles off, there will be found from 11 to 17 fathoms of water, bottom of sand, with a mixture of broken madre-pores.

Having recognised Cape St. Augustine, you may proceed to the northward, at 2 or 3 miles from the coast, until you raise the Fort Picao and lighthouse, between the N.W. and W.N.W.; then steering for the latter, it may be approached until you bring the cocoa-nut trees of Olinda, standing between the two highest buildings of the city, nearly N. by E. On this bearing, you will be at 700 or 800 toises (three-quarters of a mile) from the lighthouse, and you may anchor in 6 or 7 fathoms, bottom of sand, with shells and patches of coral; bad bottom it is true, but which it is almost impossible to avoid entirely in the road of Pernambuco.

During the northern monsoon, the coast should be made a little to the north of Olinda point, in latitude $8^{\circ} 1' S.$, and longitude $34^{\circ} 50'$: this point, as before noticed, is bordered with a rocky shelf and breakers, extending outwards about 2 miles, and therefore should be passed at the distance of 3 miles, in 8 or 9 fathoms, until you bring the lighthouse and Fort Picao at several degrees to the north of west; thus avoiding the English Bank (already described) over which the sea breaks in adverse weather."

The *Road of Pernambuco* is dangerous in such weather, as the swell is then very strong. The anchorage is on a rhomb to the west of the meridian of Olinda Point, at less than half a mile from the cay or recife of Pernambuco, and there is some risk of driving on shore with a strong wind from the points between S.S.E. and E.N.E., more particularly in the adverse season or southerly monsoon, March to September, when the winds are frequently violent.

The northern monsoon is, at times, not more favourable than the other to the surety of vessels which may anchor here. Easterly winds are more frequent than those from the north, especially on the approach of new and full moons; and although, in this season, the weather is commonly fine, and the breezes weaker than those of the opposite season, it is requisite to take all precautions against accidents; and the first of these accidents is, not to anchor too near the land.

We have noticed that the bottom of the road of Pernambuco is of bad quality; in fact, this anchorage, with a cable liable to be cut, offers no security; and vessels employed here should have iron cables, for the best serving or rounding would protect the others but very imperfectly, from the effect of the great quantity of corals, madrepore, and lost anchors, interspersed over the bottom of this roadstead.

Vessels commonly moor E.N.E. and W.N.W., in order to have a long warp towards the offing, as well as to be more firmly situated, and readier for getting under-way. It is prudent to have the sails and all things so disposed as to get under-way promptly, should it be required. In the contrary case, drop an additional anchor in the evening, which you raise next morning.

Should you be obliged to remain some time in the roads during the southern monsoon, it may be convenient to have two anchors ahead toward

the offing, and one anchor on the poop to drop toward the W.N.W., in order to hinder the vessel's drifting during the calm which often succeeds a squall. The last anchor serves to resist the land-breeze, which, however, is rare in this season, and not strong in the road in any time of the year.

The *Harbour of Pernambuco*, formed on the coast by the *Recife* which borders the shore, is sufficiently large and deep for receiving a certain number of vessels drawing from 10 to 12 feet of water. This port, as already noticed, is divided into two parts. The first, or exterior port, is named the *Poço or Well*, and is simply an anchorage, situate at the head of the reef, to the north of the harbour. Its entrance is formed by several rocks, or flats of detached madrepores, under water, and which are probably a continuation of the principal reef. This entrance is named the *Great Bar*, and on it are from 17 to 30 feet at low water. Within it vessels moor with four fasts, the head to the offing. The ground of the Poço is of sand, and the depth decreases toward the shore. This place is open to the wind from the offing, and the sunken rocks at the entrance render it untenable during the southern monsoon.

The Harbour of Pernambuco, or Port of Recife, is comprised between the cay of rock and the city, and is named Mosqueirao. It has from 2 to 3 fathoms of water, and is sheltered from the sea by the Recife. In this place are from 8 to 6 feet at half-tide; but for entering they must pass over a bar of sand, on which, at low water, the depth is not more than 7 feet. This bar is defended by the Forts Bruno and Picao, already noticed.

The marks for sailing in, by the two passages leading into the Port of Pernambuco, are 1st, for the Poço, or Small Pyramid, built on the beach, surmounted by a cross, and named the Cruz do Patrao, in a line with the Church of St. Amaro, on the continent, which is surrounded with cocoa-nut trees: these are a little way up the country, and clearly seen. The bearings of the objects in one is nearly true west; but before the leading mark is brought on, on approaching from the offing, you must avoid the English Bank, by observing the precautions before mentioned. From the Poço or Well, this bank bears nearly East, less than a mile; its shallow part is indicated by breakers. Having entered, you will see all the interior of the harbour, having the lighthouse to the south; and, by proceeding S. by W. (S. $\frac{1}{4}$ W.) you will gain the Port of Mosqueirao. 2ndly, smaller vessels commonly take, on entering, the pass immediately to the north of the lighthouse, the direction for which is, to bring the two southern turrets of Fort Bruno in one, and keeping this mark on, with 18 to 15 feet of water, until you see the western or inner edge of the Recife, with Fort Picao to the south, when you proceed along until you have the harbour, and having advanced to a proper distance, you make fast on the port side. The harbour is protected from the violence of the sea by the Recife, the lower parts of which have been raised to the level of the other, like a continued cay. This natural wharf shelters vessels in the harbour from the winds in the offing, which are at times very strong; but they rarely cause damage to vessels well moored, though in a basin of small extent."

The predominant winds in this road are those of the tropic, which may be said to blow generally from S.S.E. to N.N.E., with this variation, that, from March to September, they approach more from the South (and sometimes even from S.W.) than in any other part of the year. In the latter season they prevail, almost without interruption, from E.N.E. to N.N.E.

The land-breeze, regular in the port, is very light in the road, and is rarely felt beyond the Recife, where the breakers always deaden it; but it weakens or lulls the first winds coming from the offing. The strongest of these, both

outside and in the port, are from ten o'clock in the morning until five in the evening, that is in all the day, during the absence of the land-breeze.

The temperature is commonly high at Pernambuco, especially during the night, and until nine or ten in the morning; then, after several moments of calm, which are oppressive, the sea-breeze rising a little, reaches the coast and refreshes the air, until the moment of sunset. Notwithstanding its heat the climate of Pernambuco is considered as generally salubrious.

The tides are irregular in the port, probably because the rivers are affected by local circumstances, which increase or diminish the volume of water. The reflux or ebb is, however, perceptible after the sea has ceased to rise, and seems to accord with the lunar influence. The difference of level between high and low water commonly 6 feet; but it attains 8 feet at the syrigies, and then the strength of the stream in the port is about two miles an hour. Under the latter circumstances it is high water at 4h. 30m., afternoon, or very nearly so. In the road the tides are always irregular, and the currents are determined by the prevailing winds at sea.

The variation of the compass near Pernambuco, in December, 1819, was $4^{\circ} 48'$ W.; near Cape St. Augustine, $4^{\circ} 30'$.

OTHER DIRECTIONS FOR SHIPS BOUND TO PERNAMBUCO *—"Ships bound to Pernambuco from the eastward should get into the latitude of the lighthouse, or $8^{\circ} 4'$ S., and run down in that latitude until they see the light, which is a revolving bright and red one, and may be seen at the distance of 20 miles from the mast-head, in clear weather. When approaching the coast, at night, the lead should be used; soundings will be got about the same time the land is seen from the mast-head, say in 50 fathoms, sandy bottom.

Should a vessel fall in to the northward of the port, and not see the light, great care should be taken not to run too far in, or with less than 20 fathoms, until day-light. The town of Olinda, which is situated on an eminence, is a mark which cannot be easily mistaken. It has a beautiful appearance when approaching it from the eastward, in the morning. Indeed, it is the principal object of any notice along this part of the coast. Having got sight of Olinda, which is well known by its churches and large buildings, the lighthouse and town of Pernambuco will next be seen a little to the southward. Get the lighthouse to bear W.N.W. and run in, in that direction; you will then avoid Olinda Reef, and Englishman's Bank or Reef; you may anchor in 8, 7, and 6 fathoms, about 1, 2, or 3 miles from the light, but do not bring it to bear any more to the northward than N.N.W., as you will be then in a rocky bottom; and near a shoal that lies a little to the northward of the Jangada Passage, and about a quarter of a mile from the reef.

Should a stranger fall in to the northward of Pernambuco, a near approach is dangerous, on account of extensive reefs that lie 2 or 3 miles from the shore: these reefs also extend as far to the northward as Itamaraca. This is not the case to the southward of the harbour, for, from the shoal that lies off the Jangada Passage, before-mentioned, to Cape St. Augustine the ground is clear, with the exception of some small patches of reef that lie close in shore. Any more than these and two small rocks that lie 2 miles to the northward of the cape, and close to the shore, are the only rocks or shoals that I am aware of on this part of the coast, except small pieces of reef or stone lying on the beach.

For a Stranger to know when he is to the Northward or Southward of Pernambuco.—When to the northward the land will appear green and full of verdure, as far to the northward as Itamaraca, and no appearance of any white banks of sand. When abreast of the north end of this island three large

* From the Nautical Magazine, 1835.

cocoa-nut trees will be seen to the W.N.W.; Olinda may be seen from the mast-head, at the same time, to the S.W.; you will also see a white fort, 6 miles to the north of Olinda, named Pao Amarello. Should the wind prevent a vessel from lying along shore, on the port tack, stand off until midnight or morning, as the wind then is apt to blow at right angles with the shore, which will enable them to gain their port.

Should a vessel fall in to the southward about Cape St. Augustine the land is very remarkable, having 10 or 12 cocoa-nut trees on its summit, and reddish banks of sand. There is also a large building among the cocoa-nut trees; but the most remarkable objects about this part are some white cliffs, about three miles to the northward of the cape: these cliffs are ragged and craggy, appearing like clothes drying at a distance. Olinda will also be seen to the N.W. Should a vessel fall in to the southward of this cape, a large mountain will be seen, having the appearance of a saddle, and also two flat mountains, one on each side of the saddle mountain, bearing in a westerly direction. Should the weather be thick, so as the land cannot be seen far off, there is another remarkable object about 6 or 8 miles to the southward of the lighthouse, namely, a church, situated also on an eminence, named the Nossa Senhora das Prazeres, which has two steeples, and also a good mark for the harbour of Pernambuco.

To enter the Harbour of Pernambuco.—There are generally pilots employed to conduct the vessels entering the port; but, should none be convenient, get the vessel under-way about two, or one and half-hours before high water (if at anchor). Should the vessel not be drawing more than 16 or 17 feet, the small or Picao Channel will be sufficient. Keep the two south turrets on Fort Bruno in a line, which will lead you within 20 yards of the rock that lies to the north of the lighthouse; but this rock is steep close-to, so that a vessel may luff close round it, and keep close to the reef, if the wind permits, until within a cable's length of the lower tier of shipping; then drop the port anchor, and await the orders of the harbour-master or pilots. The bar of Pernambuco, or the shallowest water, is a little above Fort Picao, or the first gun from this fort. Vessels drawing more than 16 feet generally anchor in the Poço or Well, that is with the lighthouse bearing about S.E., distant 2 cables' length, where they may discharge part of their cargoes: this depends, however, on the state of the tides. Large ships discharge and load also outside the harbour, to the westward of the Englishman's Bank, and about three-quarters of a mile N.E. of the lighthouse. Vessels lie moored in Pernambuco with two anchors down from the side next the town and also two ropes or chains to the reef. Four vessels generally lie in a tier, and are sheltered by the reef, which is formed by nature, with the exception of a few stones which have been laid a little above Fort Picao. The sea inside the harbour is generally smooth, except at the top of high water, spring tides, when there is not only a heavy swell, but also a strong current rushing over the reef. In this case good ropes or chains should be fastened to the reef. This only lasts about two hours at each high water, during a few days, at spring tides.

There are several channels, or breaks in the reef, navigable on entering the harbour, and extending from the lighthouse towards Olinda. The first is close to the lighthouse, about one furlong wide. The large ship-channel is three-quarters of a mile wide, and clean ground. This channel is mostly used by ships outward-bound, as it is wide and safe for turning out. The marks for this channel are the cross, named the Cruz do Patrao, and a white gable of a house (a little to the north of St. Amaro church) in a line, which will clear the danger, on the southern side of the channel, or reef that lies to

the north of the small channel. Then, again, by keeping Fort Buraco open to the northward of a large building, about half a mile inland, will clear the danger or reef lying to the northward of this channel. There is also another break in the reef, or passage to the northward of this, but seldom used by large ships, as it lies out of the way for the harbour. On the north side of this there is a small rock, dry at low water. Here the sunken rocks terminate, leaving a fourth channel between this rock and Olinda, used only by coasting-vessels.

Olinda Reef.—Leaving Pernambuco great care should be taken not to stand too near this reef, as about the outer edge there are some rocks lying at some distance outside of it. The greatest danger of coming in contact with this reef is, when leaving the harbour late in the afternoon, with the wind so as it cannot be cleared without tacking. In daylight there is little to fear, as the broken water can be seen; but, after the first tack, night may approach, so that the breakers cannot be seen, and also a strong northerly current [which is generally the case with the wind from this quarter] which in this case requires great care, the safest way in this case is to keep well to the southward. The marks for clearing this reef in the day-time are the Camona, or the highest church in Santo Antonio, open to the southward of the lighthouse, or the church with two steeples, lying a little to the north of the other, which leads a vessel still clearer of it. If at night, do not allow the light to bear any further the southward than W.S.W. until Olinda bears N W. by W., or W.N.W., a vessel will then be a good distance off shore.

Englishman's Bank, or Reef.—The centre of the bank or reef lies about E.N.E. from the lighthouse, distant $1\frac{1}{2}$ mile. The least water I ever found on it was 13 feet, at low water spring tides, and very uneven rocky ground. To clear this reef to the northward, keep the highest church in Boa Vista open to the northward of the lighthouse. To clear it to the southward, keep the south turrets of Fort Bruno shut in with the lighthouse. The marks, when on the shallowest part of it, are the lighthouse and Boa Vista church in a line, and the largest cocoa-nut tree situated between the two highest buildings in Olinda, in a line with an old decayed church, the lowest public building in the town.

This bank, or reef, is not so bad as represented, except to vessels of a large draught of water, for when vessels are coming out of Pernambuco it is generally high water, when there is plenty of water over it. However, when tacking in the bay at low water, the former marks must be observed, as also when coming to anchor, give it a good berth to the southward, as with strong S.E. winds a very heavy sea sets into this bay. When at anchor too far to the northward, a vessel may drive on it before she could be brought up. The sea breaks heavy on it with the wind from this quarter, in the same manner as on Olinda and other reefs to the northward of the lighthouse. On entering or coming out of the harbour with open boats, these breakers should be avoided, if possible, as accidents often occur with the boat getting amongst them.

The pilotage in and out of (Pernambuco) this place is very expensive, although the pilots have no branch, yet it is customary for strangers to employ them, and even vessels trading to the port seldom refuse them. They are more serviceable in mooring and unmooring the vessel, than any great service they can render in coming in or going out. They have generally a good boat's crew, and some of them are very expert in diving, to clear away anything that may be foul of the anchor, a circumstance that often takes place; although there is one charge they make, that is, shifting the vessel down from

the discharging berth to that of loading, which could be done without their assistance; still they force their service on you, and, under particular circumstances, a master of a vessel is induced to take them. Vessels loading a sugar cargo in Pernambuco, should not load deeper than $14\frac{1}{2}$ feet, until they go outside. However, this greatly depends on the wind; for should it be from the S.E. quarter, and a good breeze, there is little danger of going over the bar, when drawing 15 or 16 feet, on the height of spring tides.

Remarks on Leaving the Harbour.—Vessels generally begin to unmoor at at half-ebb, the tide previous to their going to sea, when they have plenty of time to get all their ropes or chains in, and the vessel winded, deck clear, &c. Should the wind be from the S.E., a good breeze, get under-way an hour before high water, keep at a proper distance from the reef, and make all sail possible; luff close round the rock that lies to the northward, off the lighthouse, and observe whether the trees on Cocoa-nut Island open out to the eastward of the lighthouse; if they do, the rocks that lie to the northward of this channel will be passed to windward: then there is only Olinda Reef to fear; but should the wind be so as these rocks cannot be weathered, which can easily be seen by the cocoa-nut trees not opening out to the eastward of the lighthouse (or the shipping in the harbour), in this case, these rocks must be kept on the starboard hand, or passed to leeward, and therefore beat through the wide channel, as before directed.

It is to be observed, that all these dangers, being to the northward of the lighthouse, are nearly in a direct line with the main reef, so that when the shipping in the harbour are open to the eastward of the lighthouse, a vessel is then clear of them to the eastward, and by having them opening to the westward, the vessel may run along with safety, passing to leeward of them all; and by keeping the shipping in a line with the lighthouse, you pass on the shallowest part of them. Should the wind be so as vessels cannot lie along the reef, warping down them becomes necessary, and before sail is made they ought to be close down to Fort Picao. Masters, or rather pilots, not taking this precaution, often get to leeward, a circumstance which is often attended with danger, and sometimes proves fatal. This was the case with the brig Alcides, which was wrecked in 1832, abreast of Fort Bruno.

When ships are obliged to anchor outside, previous to their entering the port, which is generally the case, the masters usually go in with the boat, either to the King's wharf, or else alongside of a visit boat, with one mast and flag, lying inside the reef, a little above the lighthouse. The cargo is generally brought off in boats, or large launches, and attended with very little risk as the distance is not great, and not much swell. From this advantage, and the regular sea-breeze, the wall, formed by nature, with its strong guns for mooring posts, that are proof against any accident that may occur, and the healthiness of the climate, this port may be considered one of the safest and best on the Brazil coast.

Here it is high water, on the full and change, at half-past four. The vertical rise of spring tides is 8, and of neaps 5 feet. The highest tide is generally two days after the full and change."

CAPE ST. AUGUSTINE TO BAHIA.—From Cape St. Augustine, southward, the coast continues to be fronted by the Recife and other reefs, without which are gradual soundings to the distance of about 2 leagues. The Point of Meracahipe lies at 4 leagues to the southward of Cape St. Augustine; it is low, and appears at a distance inundated. When at sea, to the eastward of this point, you will, however, see an inland ridge of high ground, extending north and south, which has a break or dip in the middle, and named *Serra Sellada*, or *Saddle Hill*. This mountain stands in latitude $8^{\circ} 25' S.$,

longitude $85^{\circ} 11' W.$ When just open to the southward of Cape St. Augustine this mount may be seen bearing W. by S. ($S. 75^{\circ} W.$), and when in a line with Point Meracahipe it bears nearly N.W. by W. ($N. 59^{\circ} W.$) Above the Point of Meracahipe is an hermitage, and between Cape St. Augustine and this point are, successively, the small hamlets of Maracay and Gallinhas. From Cape St. Augustine to Point Meracahipe, and still farther southward, the land is low, level, and covered with brushwood. The coast has a white sandy beach bordered with a reef.

Nearly off the entrance of the little river of Serenhen are the little islets of St. Aleixo, lying in latitude $8^{\circ} 35' 49'' S.$ The two islets in a line bear N. $60^{\circ} W.$, *true*: between them and the land there is no passage. To the N.W. of the islets, and at several leagues inland, may be seen the Serra Sellada, already described. Captain Monteath passed the islets on the 20th of December, 1825, at the distance of three-quarters of a mile, the soundings regularly decreasing from 12 to 10 fathoms, clayey bottom.

At 3 leagues to the S. by W. from the Islets of St. Aleixo is Port Tamandare. It is against an opening in the reef, which forms an anchorage, and is much larger than most of the openings of this nature. The depth and space are sufficient for large vessels, and it is said that it will accommodate 3 or 4 frigates: the depths are from 4 to 6 fathoms; a fort on the coast defends the entrance and interior anchorage. The roadstead of Tamandare is the best place for shelter between Pernambuco and Bahia; yet it is exposed to all winds from South to N.E. by E., and vessels are not protected from the sea by the reef, for it, in several places, is very little above the level of the water.

On the parallel of $9^{\circ} S.$ is the Barra Grande, an islet situate to the N.E. of Porto Calvo, which may induce a stranger to suppose that it is a fine harbour. It is, therefore, to be noticed that it has only 3 fathoms, with reefs to eastward, and a flat rock covered with water. Its distinguishing mark is the high land of St. Bento, on the south side, and above it the church of St. Bento.

On the parallel of $9^{\circ} 11' S.$ is Porto Calvo, which is small, but will admit vessels of 120 tons, and may accommodate about 6 of that description. Those who are unacquainted with the place must keep the lead going; for along the coast, at 2 miles from the land, are reefs stretching along, having an interval, which constitutes the entrance, and which has a depth of 5 and 6 fathoms; within is a depth of 3 and 4 fathoms. About 9 miles farther you will reach the Rio Camaragibe; the shore is level, the beach white, and the reefs still continuing 1 and 2 miles from land. On the south side of the Camaragibe, stretching along shore, is a range of bare hills, or cliffs of red sand. Near the River St Antonio-merem (or little St. Antonio) is a range of red cliffs, half a league in length, and 3 small round hills, which stand on its northern side.

MACEIO, OR MACAYO, is a village situated on the western side of a wooded bluff. Here the shore trends in an east and west direction, and upon it to the south of the village, is a small fort near the mouth of a rivulet; before it is an open roadstead, protected on the east by reefs of coral, but which are covered at high water. There is a powder-magazine on the wooded bluff, east of the town, which is white, and may be seen at 4 leagues off. On advancing nearer the church will be seen. The anchorage is good, in 5 fathoms, sand and clay, with the town and fort nearly in a line, and bearing N.N.W., at three-fifths of a mile.

Ponta Verde, or Green Point, is the outer point, east of Maceio. It is covered with cocoa-nut trees, with breakers over its rocky extremity. When

approaching from the N.E., Maceio is hidden by this point, but on rounding the reefs to the westward it comes in sight. At a mile from this coast are found 10 fathoms of water, bottom of madrepores, and the depth appears to increase gradually to the distance of 4 to 6 leagues, where there are from 25 to 30 fathoms. In fine weather a vessel may anchor on almost any part of the bank. To the northward of Maceio, far up the country, are seen the Serras de Marambaya, a chain of mountains discernible at 15 leagues off, and are conspicuous over the adjoining land, which has no distinguishing mark. The middle of the mountain of Marabaya is in latitude $9^{\circ} 25'$.

The village of Juragua is situated between the Fort of Maceio and other forts, at the distance of a mile to the east; and nearly a mile to the southward of the last mentioned fort is a Baixo, or detached shoal, upon which the sea breaks with a high southerly wind. It is high water, on the full and change, at 4h. 30m. Spring tides rise $8\frac{1}{4}$ feet.

Remarks on the Port of Maceio, by Commander the Hon. F. F. de Roos :— “On approaching Maceio, when at the distance of 12 or 14 miles, a small white building can clearly be made out. It is a powder-magazine, and is situated on a wooded bluff, which overlooks the town and harbour. The land may also be distinguished by a red spot on the face of the cliff, about 5 miles to the S.W.; and by a white chapel, with two towers, in the same direction: moreover, Mount Barriga, at a distance in the interior, may be observed. It stands alone, and is higher than the land which forms the coast, but is otherwise not remarkable.

Maceio, being the only convenient anchorage between Bahia and Pernambuco, enjoys a considerable commerce, and has an extensive communication with the interior. Many English vessels annually touch here. Supplies are to be had at a moderate rate; and excellent water can be obtained in the adjoining harbour of Pajucara, at a well near the beach.

The port is formed by the point of the Barrier Reef, terminating abruptly, which extends along the shore here, a sandy beach, forming the continuation of the coast for some miles to the southward. It is an open bay, but affords protection from the prevailing winds, which blow from N.N.E. to E.S.E. throughout the greater part of the year.

The men who fish in the jangadas, or sailing rafts, which are constantly to be met with on this coast, are good pilots; but there is a regular harbour-master at the village of Juragua, who will come off to bring ships, on their firing a gun.

The anchorage of H.M.S. *Algerine* was in $5\frac{1}{4}$ fathoms, the end of the reef bearing S.E., and the covered wharf, or trapiche, E. 58° N., by compass. From this anchorage the sea is open from S.E. to S.W. $\frac{1}{4}$ W., bottom sand and clay; a quarter of a mile in the direction of the trapiche are moorings laid down for the trading packets from Pernambuco and Bahia, which call every fortnight.

Persons acquainted with the port generally approach it, keeping within a quarter of a mile of the reef, and in this manner rounding the point; but strangers are not recommended to do this, as the soundings are irregular, and the Baixo, with only 15 feet of water on it, is to be avoided. The safe rule is not to bring the powder-magazine to the eastward of North, till you have passed the point of the reef; you may then haul into your anchorage.

In the nine summer months this port may be deemed safe; but in June, July, and August, when the southerly winds prevail, it is very much exposed. No English mercant vessel has ever been wrecked here, though one brig, not long since, drove and bumped her rudder to pieces in a southerly wind. Instances of Brazilian wrecks frequently occur.

There is an adjoining harbour (to the East) formed by the same reef, named *Paiucara*, which affords shelter for small vessels only. It is shaped like a basin, the entrance being near the centre. It is very shallow, and seldom used, as with the wind to the northward of N.E., a vessel cannot fetch in. One corvette and two brigs of war have been built in *Paiucara*.

The latitude $9^{\circ} 39' S.$ is that given by Baron Roussin; the longitude $35^{\circ} 40' 10'' W.$, is determined by applying the difference of longitude, $2^{\circ} 48' 19''$, as measured by the excellent chronometers, to the longitude of Bahia. This is assumed to be $38^{\circ} 28' 50''$, which is the main result of occultations observed by myself in the year 1823."

Further Remarks on Maceio, by Captain C. R. Drinkwater, R.N.—"Maceio is a small port, about 100 miles south of Pernambuco. The land to the northward is of moderate height, abounding in red cliffs. Above the port there is a remarkable appearance resembling a rock cut up the hill, which is a pretty good mark. The harbour is formed by reefs, the entrance round the southern end. H.M. ship *Doris* anchored in 8 fathoms, rock; broke the anchor in heaving up, three hours after. A little farther in the bottom is clearer, as seen by the sludge. There is a constant swell setting in."

The bar of St Miguel das Alagoas is the mouth of a small river which comes from the N.W., and on the northern border of which is the little town of Sta. Anna. The bar of St. Miguel admits of none but very small vessels. The same is the case with Porto Franciz, a small anchorage at about 2 leagues more to the north; craft drawing 6 feet may enter Porto Franciz, the only point of communication from the lakes to the sea. The large coasters stop in the exterior anchorage for receiving, by the *jangadas*, the merchandise of the country.

To the south-westward of Rio St. Miguel, in about $10^{\circ} 2' S.$, to the bar of Jiguia, which is not always navigable for coasters, and they more frequently anchor outside, but with high tides it allows the passage of the smacks of 80 tons. On proceeding southward from Jiguia you pass the mouth of the little River Poxim, on which is the village of Conceicao; and at the distance of 4 leagues thence is the Bar of Cururippe, off which, at the distance of nearly 1 league, is the Dom Rodrigo Rock, which is probably connected to the chain of reefs; on other parts of this coast you may approach to the distance of 2 miles, where there is generally from 10 to 13 fathoms of water.

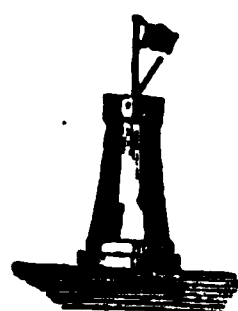
RIO SAN FRANCISCO.—This is a broad and rapid river, but shallow at its entrance. It is subject to great inundations from September to March, and the current is so strong that it cannot be stemmed by an eight-oared barge. The entrance of the river is bordered on the south by Manguinha Point, which is low, and covered with mangroves; from it heavy breakers extend seaward $1\frac{1}{4}$ mile. The north point is also low, and of quicksand, without vegetation; the coast northward of it is of the same nature, and there are breakers as on the south. The passage in is between the breakers, and vessels anchor before it in order to engage a pilot, whose assistance is absolutely requisite. Small craft only can enter it, partly owing to the rapidity of the stream, and partly to the shoals at its entrance. According to the pilots the mouth of the river has a depth of 12 or 13 feet at high water.

THE RIVER COTANDIBA, COTINGUIBA, OR MAROIM, lies on a parallel of $11^{\circ} S.$ It has not a great depth of water on the bar, but is much frequented by the coasters. When you have brought the bar to the west, you will see Mount Aracaju several leagues to the N.W., remarkable from its form, in the direction of the coast, with an opening at its northern extremity. To the west is the high land, named the Morro do Selha, which is in the form of a cardinal's hat.

The following notification, relative to the navigation of this river, was published on the 7th of March, 1848. It will be observed that the depth of water on the bar is represented to be about 16 feet at spring-tides, while it has been hitherto stated that there are only 7 feet; we may, in consequence, conclude that some considerable improvement has taken place in the state of the bar.

“The bar of Continguiba River is in lat. $10^{\circ} 58'$, or $10^{\circ} 59'$ S., and vessels making the port should keep well to the north of the bar, as during the shipping season, from October to April, there is a very strong N.E. current down the coast. Vessels may close with the land until within soundings of 5 or 6 fathoms, when they will be from 2 to 3 miles distance from the bar; and they should then hoist a signal at the fore for a pilot, who will proceed on board as soon as the tide turns for the ebb.

When in sight of the signal-post from the ship, the signals should be observed, as they are intended for a guide to vessels entering the port; and of their purport the following is an explanation:—



1st.—The upper flag hoisted alone is the signal that the vessel is seen from the shore.

2nd.—The lower flag, which is hoisted upon a moveable staff, denotes that the vessel should tack, either to the north or to the south, as indicated by the direction of the sloping flag-staff.

3rd.—Both flags being hoisted on the central flag-staff, one above the other, signifies that the vessel is in the right position of the bar, and that the tide is favourable for entering. The vessel should then steer direct for the signal-post on the beach, and the signals will remain flying even after the vessel has passed the bar.

4th.—If either one or both of the flags be hoisted and lowered again, it implies that the master should stand off.

If the master of a ship has never been in the port before, he should not attempt to enter without a pilot, and should avail himself of the telegraph only in case of absolute necessity.

Long before the signal-post is visible, there is a chain of mountains that may be seen in clear weather. It is named La Itabayana, and is so denominated in the English charts. Its southernmost point is named, from its similarity in shape, the Cardinal's Hat, and bears from the bar W.N.W. $\frac{1}{4}$ W.



Coming from the northward there may be seen a distant and solitary hill, named Aracaju, at the entrance of the river, which, when the vessel is about 2 or 3 miles E.S.E. of the bar, bears W.N.W. $\frac{1}{4}$ N.



Coming from the southward the bearings will be nearly the same, but great care must be taken not to enter the River Vazabarris, where the signals are very similar, and which is only 14 or 15 miles to the S.W. of the Catinguiba

bar. The bearings of the Cardinal's Hat from the Vazabarris are N.W. $\frac{1}{4}$ N., and the Aracaju is not visible.

There is good anchorage to the northward of the bar, in 6 or 7 fathoms, hard firm sand; but vessels should, if possible, always remain under way, and though they make the port too late for the pilot to come off that night, still they should hoist the signal at the fore, and stand out to sea, keeping well to the northward, where they will be sure to meet the pilot outside in the morning.

Vessels coming either from foreign or Brazilian ports should be very particular in being provided with all papers required by the authorities in any

Brazilian port, as the custom-house is very strict, and in default of such, the usual fine will inevitably be levied according to the custom-house regulations.

The pilot-boat is a fore and aft schooner.

The depth of water in the channel on the bar is about 16 feet at spring-tides, but as vessels cannot get under weigh from the anchorage before the ebb begins, and as a good deal of time may be lost before they reach the bar, they ought not to draw more than 11 feet."

The River Vazabarris lies south-westward from Cotandiba 10 miles. In approaching from the east, or the south, you may see three small hills, named the Os Tres Irmaos, or the Three Brothers, situated three leagues to the S.W. of the entrance of the River Vazabarris. The town of Sergipe is built at the foot of these hills. The mouth of the river is bordered on the south by a long point of white sand, and is, as well as the north point, encompassed by violent breakers, which render an entrance difficult, under the most favourable circumstances; the channel has only 10 or 12 feet water.

RIO REAL.—This river lies 21 miles S.S.W. from Vazabarris, and when seen from the offing the mouth presents nothing remarkable but the breakers on each side. Mango Sieco (the south point) is an extension of a beach of white sand, named the Prancha, or Plank of Rio Real. From sea, at about two miles off, are seen a number of huts in the environs of the bar; over the latter there are only 15 feet of water, with high tides. The swell is heavy, and the passage always dangerous, and to be attempted only by the boats and pilots of the country. A strong current sets outward from the river.

All the coast extending from the Rio St. Francisco to the Rio Real is low, sandy, partly covered with bushes, and interspersed with little woody hills. Without the Recife, or line of rock, the ground is generally clean, and between 2 and 10 miles off the depths are from 9 to 30 fathoms, bottom of ooze, sand, and broken madrepores.

ITAPICURU —From the bar of Rio Real to that of Itapicuru the distance is 7 leagues: it has only 7 or 8 feet over the bar with high tide, and is much obstructed by breakers, which render an approach dangerous, no distinguishing marks being seen from the offing. On bringing it to the west the opening may be seen, between downs on the right and left, and there is a hamlet on the south side, at some distance within the entrance. The only vessels which enter are the decked boats and jangadas or rafts of the country. From the bar of Itapicuru the coast trends in a more southerly direction, beyond the parallel of 12° . Along the greater part of the coast are the reefs, and a strand of white sand.

In latitude $12^{\circ} 32' 30''$ S., longitude $37^{\circ} 58' 30''$ W., is the town of Garcia da Vila, the most remarkable object of this part of the coast; it is a sort of fort, on the rising land, situate among some trees, and having a signal post; all the shore may be approached to the distance of a mile, in 11 to 14 fathoms, bottom of sandy ooze and broken madrepores or coral. The depths increase quickly, and at 10 miles off there is no bottom at 40 fathoms. From Garcia da Vila the coast trends S.W. to Itapuan Point, an extent of 11 leagues. The Recife or border of rocks continues all the way, and many are always above water, appearing like islets: those in particular about Point Itapuan are seen detached from the coast.

The Baron Roussin says, that on all the extent of coast between the parallels of 10° and 13° , we have found that the winds of the northern monsoon have daily variations, a knowledge of which is useful to those bound northward. During the night the land-breeze ceases, but this is seldom felt beyond

the reefs. On the approach of day, however, the breeze freshens and blends with the winds of the offing, which seem attracted by the north coast toward noon; after this hour, the wind becomes more easterly, so as to make an angle of about two points of the compass between that of the morning and that of the evening. It follows that the borders are affected by these varieties, of which advantage may be taken.

BAHIA, OR BAY OF ALL SAINTS.—From Point Itapuan the coast trends nearly W.S.W. 11 miles, to Cape St. Antonio, at the entrance of Bahia, or the Bay of All-Saints; upon the extremity of which are the fort and light-tower of St. Antonio. The light is elevated about 120 feet above the level of the sea, and revolves every 4 minutes; but it is too weak to be seen at more than 4 or 5 leagues off. By day, on bringing it to the west, Fort St. Antonio appears to be separated from the land, by a small interval. At $2\frac{1}{2}$ miles East, several degrees South, from the light-tower, is another point, on which is a look-out and signal station; this point is the southernmost of the promontory of Bahia, and it forms, with that named Itapuanzinho, at a mile more to the east, a small bay, or cove, occupied by an armacção, and defended by the rocks. Some habitations are remarkable on the coast about the cape, but landing is difficult. Here the Recife or border of reefs terminates.

The entrance of Bahia, or Bay of All-Saints, is formed, on the west, by the Island of Itaporica, and on the east by the peninsula, on which stands the City of St. Salvador, or of Bahia: within it the land forms an extensive gulf, or inland sea, bearing the name of *Reconcavo*. The entrance of the bay is 7 miles broad, and the gulf within about 32 leagues in circumference.

The narrowest part of the principal entrance to Bahia is $4\frac{1}{2}$ miles broad, but about half this space, on the eastern side, is navigable for large vessels, owing to ledges of rocks and uneven ground extending from the East and S.E. sides of Itaporica, which should not be approached to less than 8 or 9 fathoms. Without this entrance, on the eastern side, is the Bank of St. Antonio, the outer extremity of which is $4\frac{1}{2}$ miles S $\frac{1}{4}$ E. from the Cape of St. Antonio. It is of an irregular shape, but narrow in proportion to its breadth, and extends nearly north and south. The least depth on it is about 13 feet, at low water. As the sea occasionally breaks over some parts of it in strong winds, it is best to pass outside of the above distance in a large ship. Between the bank and the shore is a channel, having a depth of 10 fathoms, with a muddy bottom; about 2 miles to the eastward of the southern point of the bank the depth is regular, from 35 to 20 fathoms, and which may be carried close to it.

At the entrance of the harbour the depths are from 14 to 16 fathoms, within half a mile of the eastern shore, whence it deepens to 18 or 20 fathoms, westward, until about two-thirds across, farther than which heavy ships ought not to stand. To the westward of this are overfalls, shoaling from 14 to $6\frac{1}{2}$ fathoms, then deepening again to 12; and in some places, at $2\frac{1}{2}$ miles from Itaporica, there are no more than 3 fathoms. On the eastern point of Itaporica, the reefs extend about a mile from shore; and at about a cable's length without them the depth is 6 fathoms; it then increases quickly to 12, 18, 24, and 26 fathoms, soft muddy bottom, and in the midway over is more water; from this, in an easterly direction, the depth gradually decreases to 12 fathoms, at a mile or $1\frac{1}{2}$ mile from Fort do Mar.

The Panella Reef is a spot of very foul ground, about half a mile in length, from the centre of which the Fort do Mar bears E.S.E. $\frac{1}{4}$ E., three-quarters of a mile. It has, on some parts, only $3\frac{1}{2}$ fathoms, at three-quarters ebb; on

the other parts are 10 fathoms, rocky bottom. There is good anchorage around this shoal, between it and Fort do Mar in 7 or 8 fathoms, without it 12 or 14 fathoms, above it 8 or 9 fathoms, and below it, in the same depth, on good ground, small vessels generally lie between the city and Fort do Mar.

The best anchorage for ships of war is in 10 or 12 fathoms, with Fort do Mar bearing N. 73° E., and Montserrat Fort N. 28° W., at about $1\frac{1}{2}$ mile from the city. From this spot they will be able to get clear out, with the very light morning winds, as the ebb tide sets strongly toward Forts Cabo and St. Antonio.

The watering-place is at a short distance from the south end of the town, between it and Fort Gamboa; off the latter, a shoal extends along shore, and one-third of a mile outward. On this shoal H.M. Sloop Bonne Citoyenne grounded in 1812; it has only 10 feet over it at three cables' length from shore, hard sandy bottom. In 1841 a red buoy was placed on this shoal, in $2\frac{1}{4}$ fathoms, at low water: on entering it must be passed on the starboard.

The following instructions for sailing into or out of Bahai are extracted from the *Nautical Magazine*, 1835:—

“*Ships destined for Bahia during the southerly monsoon*, should steer for the Morro of San Paulo, in latitude $13^{\circ} 21' 53''$ S., and longitude $38^{\circ} 54' 23''$ W. Although this Morro is of little height, it is sufficiently remarkable by being backed and followed to the northward by land lower than itself, and by having, on its northern extremity, 5 or 6 cocoa-nut trees, divided into two groups, and very distinct in comparison with the surrounding land. The hummock, which terminates this Morro to the north, when seen from a short distance, presents on the side nearest the sea large white spots, which form a striking contrast with the surrounding verdure, and which may be seen at the distance of 8 leagues, in clear weather.

To the northward of the Morro of San Paulo the coast is low, sandy, and bordered with reefs; it forms a deep bay, after which it turns to the N.E., and joins, at least in appearance, with the high island Itaporica, which forms the west side of the entrance of San Salvador.

The separation between the west side of Itaporica and the continent, forms what is called the false bar, or false entrance of Bahia, which is very narrow, tortuous, shallow, and cannot easily be distinguished. It will admit but very small vessels, and even the coasters do not use it, except when trading there, or when the wind will not permit them to use the principal entrance.

From the Morro of San Paulo to Cape St. Antonio the distance is 10 leagues, and the direction is N. 46° E.; in fine weather these two points are visible from each other.

From near the Morro of San Paulo a ship may steer N.E. without danger; a depth of 34 to 12 fathoms water will be found on a bottom of mud, sand, gravel, and coral, and this course will lead at a convenient distance, between the edge of the banks to the southward of Itaporica and that of St. Antonio. A large vessel should not go to the N.W. of this line, while to the southward of Itaporica; and, if the wind blows strongly on the coast, she should keep outside until certain of being on the meridian of the Point Tabaru, the east point of that island, which will be known by the depth being above 11 or 12 fathoms.

If necessary to work to windward, it will be advisable to go no nearer than 5 miles to the coast of the continent, when to the southward of Itaporica, and to keep at the same distance from the island until Point Tabaru bears North. With this point bearing North, and at 7 miles from it, Cape St. Antonio will bear N 41° E. (*true*) distant 5 miles, and the south extremity of the bank

off the cape about a league to the eastward; and from thence a course may be shaped for the cape until within half a mile of its shore, and then another direct for the church of Bom Fim, or Montserrat, until abreast of the Fort do Mar, near which is the ordinary anchorage.

Ships bound to Bahia, during the northerly monsoon, should endeavour to make the land some leagues to the northward of Point Itapuan, which is on a parallel a little north of Cape St. Antonio. During the southerly monsoon they should steer for the Morro of San Paulo.

The only precaution necessary to be taken by ships from the northward, in order to avoid the bank of St. Antonio, is to give a berth of 4 or 5 miles to the cape in rounding it, until it bears N. by E. $\frac{1}{4}$ E., when they may steer for the church of Bom Fim (on the peninsula of Montserrat) until abreast of the Fort do Mar, or of San Marcello, near which is the ordinary anchorage. The depths in this course vary from $10\frac{1}{2}$ fathoms (at a mile west of the Bank of St. Antonio) to 18 fathoms, (at the same distance from the fort of that name;) closing afterwards the shore, the depths will diminish gradually to 9 or 8 fathoms, near the Fort do Mar. If, in making this route, the wind should prove contrary, some boards may be made of 2 or 3 miles, between the bearing which joins Cape St. Antonio to the Church of Bom Fim, and the banks on the S.E. coast of Itaporica; but it will be necessary to keep the lead going on both tacks, and not to go into less than 7 fathoms.

The ordinary anchorage of ships of war is between West and S.W. of Fort do Mar, at the distance of 2 to 10 cables' length from that fort. The following bearings were taken at the anchorage, in 9 fathoms, on bottom of sand:—The Point Maguinha of Itaporica, at N. 53° W; the Fort of St. Antonio, S. 19° W.; the Point Montserrat, N. 10° E. (*true bearings*) The great number of anchors lost in this bay renders it necessary to round the cables, and examine them frequently.

The anchorage for merchant ships is within the line that joins Fort do Mar and the Point of Montserrat. In going in, the Panella Rock must be avoided, which the pilots place at 160 fathoms W. by N. from Fort do Mar; and on it, they say, there are not found more than $3\frac{1}{2}$ fathoms, at low water.

The best place within the anchorage, for ships of war, is opposite the obelisk of the public garden; moor in a N.N.E. and S.S.W. direction, that of the flood and ebb tides.

The prevailing wind is from East and S.E., with which ships may get in on one board. During the night the wind is from various points of the compass, and principally from the land side.

The Bay of Bahia, San Salvador, or Todos os Santos, considered in its whole extent, forms a deep gulf in the continent. The gulf which bears the name of Reconcavo, is nearly 30 leagues in circuit. The sea penetrates every part of it, and it receives the waters of several rivers, of which some are considerable.

The route for going out of Bahia is the same as that coming in. A vessel must run along the coast at half a mile to a mile distance, until she is abreast, and to the westward of, the lighthouse of Cape St. Antonio; in this track, from the Fort do Mar, from 9 to 20 fathoms will be found, and if further off a greater depth, even to 28 and 30 fathoms. Having arrived at a mile west of Cape St. Antonio, and steering S.S.W. $4\frac{1}{2}$ miles, the shoal off the cape will be passed in a good depth; after which a course may be shaped *to the eastward.*"

MORRO DE ST. PAULO.—About $5\frac{1}{2}$ leagues to the southward of Itaporica

Island is the Morro or Headland of St. Paul, in latitude $13^{\circ} 22' S.$: this is the part which former navigators were accustomed to make, when bound to Bahia, during the months of March and August, and from hence proceeding northward to the bay; but those East Indiamen who frequently have put into St. Salvador, for refreshments, have never experienced any difficulty in getting to the southward, at any season of the year, but have found the wind generally drawing well to the eastward here, and still more so as they have proceeded to the southward.

The Morro de St. Paulo appears, at a distance, like a lofty bluff ragged hill, but, as you approach it, its sides are highly cultivated, and on its summit stands an old fortification; having passed that, the land forms a bay, the water within which is transparent, and still as a pond. The coast of the island of St. Paul is bold; the town of this island is the capital of the presidio of St. Paul (but it is a miserable one) delightfully situated. Here also are a fort and garrison.

To the N.W. of the Morro of St. Paulo is the mouth of the River Una which is nearly 3 miles broad, and forms a convenient harbour. Its western shore is low and sandy, being bordered by a sand-bank more than a mile broad on the outer part, but inward it diminishes to a point, at $2\frac{1}{2}$ miles W.N.W. from the Morro. On this line of direction the soundings, with clean and good ground, vary from $4\frac{1}{2}$ to 5, 6, 7, and 8 fathoms, with secure anchorage, sheltered by the high lands to the eastward, the Morro bearing about E. by N. a mile distant. The landing-place is half a mile within the Morro, on a small bay, within which is a village protected by batteries, and having a red projecting cliff on the west. High water at 3h. p.m.; rise 6 feet.

The low islet, Tinhare, lies without the Morro, to the S.E. It is 3 cables long from W. to E., and surrounded by foul ground, with breakers extending from it, on the N.E., at 7 cables from the fort on the Morro point. The coast of Boypeda Island, southward of St. Paulo, is rocky and dangerous, particularly in the southern part, named the Morrera Reef. Nine miles from the latter are other dangerous reefs, which extend far out from Ponta dos Castelhanos. It is advisable that vessels passing should not approach the coast hereabout, within half a degree.

Point Castelhanos is the north point of an elevated coast, whence it inclines to Ponta da Muta, a low point, off which lies the little isle, Quiepe, which is surrounded by rocks. This island, with the adjacent coast, form between them a small basin, distinguished by the little town of Camamu. The entrance into this is impeded by breakers, which prevent the approach of all but small vessels. The land of Camamu, to the southward of Castelhanos point, is covered with mangroves. Its termination may be known by the Pedra Branca, a white rock upon the south side of the Rio das Contas, a river accessible only by boats. From the Contas the coast trends S. $\frac{1}{4}$ W. ten leagues. All along it is perfectly clean, and large ships may proceed along it, at the distance of two miles.

ST. GEORGE DOS ILHEOS.—This fort is situate on the south side of the bay of the same name, and appears like a part of the little town, which is the capital of the province. The Rio Ilheos is large, but divided inland into many small branches. The fort of St. George, on entering the river, may be seen on the north side. On the bar is little more than two fathoms. The north point of the entrance is a high land named Ponta de Caó, or Dog's Nose, at the base of which are some rocks, over which the sea runs in breakers. Two remarkable islets lie off the mouth of the river, at a short distance to the east, and appear, at a distance, in the shape of cardinals' hats; one is covered with trees, and the other is bare, and frequently

covered with breakers. These islands form, with the coast, a shelter for the coasters. A range of reefs extend to the southward, athwart the mouth of the river. Hence vessels, proceeding to the latter, must round the northernmost islet (*Ilha Verde*) off the western side of which they may anchor in 8 fathoms.

From the fort of St. George dos Ilheos, S. 4° E., distant 21 leagues, is the mouth of the Rio Grande de Porto Seguro, the entrance of which may be known be the thriving town of BELMONTE—a new settlement. This town is situated on the south point of the river, and is masked by heavy breakers on shore to the right and left. The river has not more than two fathoms over the bar, at high water. The coast, northward of Belmonte, is straight, woody, bold-to, and may be approached with safety. At from 1 to 5 miles from shore are found from 7 to 21 fathoms of water, over a bottom of ooze and broken madrepores.

Ten leagues to the north of Belmonte are the southern boundaries of the *Serras de Itaraca*, a group of mountains terminating the low lands which follow Mount Pascoal, or Pascal, to the north. The southernmost of this group are the *Morros de Commandatuba*, where there is a small river of the same name, in latitude $15^{\circ} 19'$ S.

PORTO SEGURO, to the southward of Belmonte, in latitude $16^{\circ} 26' 50''$ S. and longitude 39° W., is formed by a reef of rocks running out a mile from the main land, and in the direction of the land, thus forming a projection similar to a mole,—for these rocks become dry at low water, and end sharply and suddenly; between these rocks and the land is the entrance to the harbour, and over the bar, at high water, are 20 feet, but within, only 12 feet; the ground is fine sand, and forms a broad beach. Here are a number of cottages belonging to fishermen, with cocoa trees and orange grounds, the land to the northward rising to a steep hill, on the summit of which stands the town.

To the southward of Porto Seguro, distant two miles, is the chapel of *Nossa Senhora da Judea*. It is elevated, and its white walls, with the trees beyond it, form an excellent sea-mark; beyond the chapel is a small shallow bay named *Trancosa*. Farther southward is the Rio dos Frados, the mouth of which is completely choked by a bar, and there is not a single plantation on its banks. Southward from hence is the Rio Jucurucoe, on the northern banks of which stands the *Villa Prado*, a place considerably frequented for the article named *farinha*; but in the village, *Alcobaca*, which stands more to the southward, *farinha* is in greater demand.

MONTE PASCOAL, or *Mount Pascal*, in about latitude $16^{\circ} 54'$ S. and longitude $39^{\circ} 28'$ W., rears its circular white head, and is conspicuous to a great distance, serving as a pilot-mark in the dangerous navigation to the Rio Caravelhas; for all along the coast, hereabout, is an assemblage of rocks, islands, and sand-banks, which render the navigation very intricate and dangerous to a stranger; but the fishermen and pilots of the place conduct their vessels through the various channels with great skill and safety.

The Itacolomi is an irregular assemblage of rocks, and sandy-banks, extending in a north and south direction 11 miles, at a distance of 5 to 10 miles from the coast: several of them are uncovered at low water. You may navigate and anchor between them and the land from the southern extremity to one half of their length, as the northern part is connected to the shore by a bar or bank of sand, which is said to leave no passage. By keeping 13 miles from the coast you avoid all danger, and have from 10 to 20 fathoms of water; at 16 miles more to the east there are 80 fathoms. As you advance to the land, north of the parallel of Mount Pascal, you may approach it to the dis-

tance of three miles, when the depths are from 10 to 22 fathoms, on a great part of the coast to the northward.

THE ABROLHOS, twelve leagues from land, in latitude $17^{\circ} 58'$ S. and longitude about $38^{\circ} 36'$ W., are four islands, exclusive of several patches of rock, of which the largest is at 150 fathoms to the north of the largest and easternmost island. These islets form almost a square; the two northernmost are the highest, that to the west being 130, and the other 150 feet high. The group may be seen from the top-mast head of a frigate, at the distance of 22 miles, in clear weather. The N.W. island is named Seco, the S.W. Barbara, the S.E. Passaros or Birds' Island, and the N.E., which is the largest, perhaps half a league long, Monte dos Pedros: these islands are without either wood or water, but abound with rats and turtle.

On the west side of the Abrolhos is the channel bearing the same name. It is bounded on the west by the extensive banks and reefs named the Prancel das Paredes, on which are many rocks even with, and some above, the water's edge: these banks, and the shore within them, are very imperfectly known, not having yet been properly surveyed. The extent between their northern and southern parts is a distance of 13 leagues. There is said to be within them a small channel along shore, known to the coasters only, and not to be attempted without a most experienced pilot. The eastern side of the Paredes rises abruptly from the bottom of the sea, without indicating any diminution of depth. From the edge of these banks, as well as in the middle of the Abrolhos Channel, in clear weather, the opposite coast may be seen. This coast is flat and covered with trees, which, at this distance, appear as if nearly overflowed; hence, also, the Abrolhos Islets may be seen.

In the Abrolhos Channel the general depths are from 14 to 9 fathoms, with the exception of a few spots of 7 fathoms. The direction in which there is the most water is nearly S.S.E., and N.N.W. in passing at two miles to the west of the islets. Baron Roussin says, that although this channel is 3 leagues wide, it is of little consequence to large ships; but, from an extract of a letter from a naval officer, dated at Rio, in October, 1834, says—“We sailed round the Abrolhos Islands, and found the inside channel perfectly safe. In daylight, and favourable weather, any ship may sail inside them without risk.”

Mr. Wood, master of H.M.S. Tartar, in 1823, says—“The Abrolhos are low, and their vicinity should be approached with caution; but, with due attention to the lead, they may be passed with safety; and should a vessel be so situated, while attempting to pass them, either from the southward or northward, as not to be able to weather them without tacking, they will find a safe channel to the westward of them, and of some rocks just appearing above water.”

Extract of a letter from Captain Fitzroy, of H.M. Sloop. Beagle, dated Rio de Janeiro, 10th April, 1832:—“On the 18th of March we sailed from Bahia, and worked our way slowly towards the eastern limits of the Abrolhos banks. The winds, being light and easterly, favoured our sounding frequently, and taking good observations.

Having reached the parallel of the islands, to the eastward of the easternmost soundings laid down in the charts, and finding no ground with 300 fathoms of line, I began to steer westward, sounding continually, and keep-

* In H.M. Ship Doris, by adopting the channel inside the Abrolhos, in 1823, made the passage to Bahia, from Rio Janeiro, in half the time that the Conway did, by keeping well outside. The Doris sailed from Rio after the Conway, and arrived before. The Doris had smooth water and favourable weather, while the Conway had a troublesome sea and much wind.

ing a sharp look-out at the mast-head. At 2h. p.m., on the 26th, we had no bottom with 230 fathoms, and at 4h. p.m. we found only 30 fathoms, without the slightest change either in the colour of the water or in its temperature, or any indication of so sudden a change in its depth.

From that spot we had soundings in less than 40 fathoms, until we anchored near the Abrolhos Islands.

I passed to the southward and eastward of them, because that side had not been examined, but time would not allow of my doing what I wished, while so favourable an opportunity offered.

At least a fortnight would be necessary to complete the survey of Baron Roussin, which appears, so far as we have examined, to be extremely correct. The soundings are so irregular that little dependence can be placed on the lead. It is only by a multitude of soundings, by watching the sea when there is much swell, and traversing every part with a sharp look-out at the mast-head, that the neighbourhood of the Abrolhos, particularly to the S.E., can be thoroughly examined.

More than once we had 4 or 5 fathoms under one side of the vessel, and from 15 to 20 on the other side. The *sauts de sonde* (skips of bottom) as the French express it, are surprising.

The tide, or rather current, which we experienced, sets continually to the southward for the three days that we were near these isles, varying from half a mile to a mile and a half an hour.

I supposed that the bottom was composed chiefly of coral rock, but was surprised to find no coral, excepting small fragments growing on the solid rock, which is chiefly gneis and sandstone. As most of the charts say 'coral rock,' I have sent a few of the soundings for your inspection, and you will see by them that what has been here called coral is the coating of a solid rock, formed by the deposit of the sea water, mixed with coralline substances, and what a sailor generally calls barnacles.

My meridian distance of the Abrolhos Rocks from Bahia, their latitude and their size, agree precisely with those given in the French survey. But between Bahia and Rio de Janeiro, there exists a difference of from 4 to 5 miles between us; this being the only point on which I have found any difference, either on this or on the Beagle's former voyage.

Having made both passages I venture to observe, that going within the Abrolhos certainly shortens that between Rio and Bahia very much; but yet I should not recommend it to any vessel, unless she has reason to make unusual haste. The soundings are very irregular, varying suddenly from 20 to 6 fathoms; and there are both reefs and currents."

Baron Roussin has said that an oozy or muddy bottom is rarely found on the ground of the Abrolhos; the presence of oaze in the soundings bear a certain indication that you are without the shoals. He found no part without a large mixture of sand and broken madrepora, or bits of coral, and in the interior channel only; and he adds that the quality of bottom, most common round the Abrolhos, is a whitish sandstone, composed of the debris of madrepores, and of a greater or less consistence; sometimes this stone is very firm, combined of sand and rock, mostly to the N.E. of the islets. Nearer to these, from S.S.W. to N.E. by the West, the bottom consists of ground like white mortar, in which the anchor penetrates but little, though it holds fast.

At four or five leagues to the north of latitude $18^{\circ} 26'$ commence the soundings which announce the grounds of the Abrolhos and Paredes. In *circumscribing these banks, the islets and the shoals, in depths under 20 fathoms, an extent 20 leagues east and west may be assigned; and it follows*

that a large vessel, unnecessarily, should never run to the westward of the meridian of $37^{\circ} 40'$, between the extreme parallels of the shoals, or $17^{\circ} 30'$ to $18^{\circ} 15'$ S., whereabout, upon the bank, a depth of from 20 to 25 fathoms may be found.

In following, from north to south, the meridian of $37^{\circ} 30'$, from the parallel of $17^{\circ} 40'$ to that of $18^{\circ} 10'$, the soundings skip, at certain places, from more than 100 to 24 fathoms, rocky bottom, indicating, as very probable, a still less depth; but, on a search several miles more to the east, no bottom was found with the common lead. In longitude 37° no ground at 200 fathoms.

SAN MATHEO.—On the low shore, in latitude $18^{\circ} 36'$ S., is the little River San Matheo. The difficulty of the entrance, wherein there are only $4\frac{1}{2}$ feet of water, in ordinary high tides, does not allow access to any but very small vessels, and the breakers, which constantly appear at the mouth, render the navigation dangerous, even to canoes. The pilots say that the River of San Matheo turns to the north above the entrance, after which it has many sinuosities. The little town of Matheo lies 7 leagues from the entrance.

To the southward of the bar of San Matheo, distant 36 leagues, is Point Tubarao on the north side of Espirito Santo. Between are the small Rivers of Rio Seco, Rio Doce, Reis Magos, and Carahype, which are all unimportant to navigators. From Point Tubarao a reef of rocks extends to the distance of 700 fathoms; with this exception, you may approach any part of the coast, at two or three miles off, whether advancing from the north or the south. The depths are from 20 to 9 fathoms, bottom of sand, mixed with gravel, oaze, madrepores, and broken shells.

ESPIRITO SANTO, OR PORT VICTORIO.—The entrance of this bay may be readily known in approaching from the north or the south, by two conspicuous mountains, named Monte Moreno, and Mestre Alvaro.

Monte Moreno is situate on the south point of the bay. It is conical and partly woody, but devoid of verdure on the eastern side, and may be seen, in clear weather at ten leagues off. Its bar forms, on the north, the south side of the entrance of the River Espirito Santo. At $2\frac{1}{2}$ miles to the SE of it are two rocks of unequal size, named the Pacotes; and at about a mile S. 60° W. from Mount Moreno is the Morro of Nossa Senhora da Penha, a rocky hill, on the summit of which is a handsome church of the same name, and which may be seen at a distance of 5 leagues. The elevation of the Mestre Alvaro, to the northward, its form and insulated position on a land rather low, render this mountain equally remarkable; and it is to be noticed that it succeeds the low lands of the north, and nearly terminates the high lands of the south, so as to leave no doubt, when it is in sight, as to the position of the vessel, even when the latitude is uncertain or cannot be obtained.

Two islets, situate at a short distance to the N.N.W. of Monte Moreno, occupy a great part of the harbour of Espirito Santo; but although the space comprised between these isles and the hill is much obstructed by reefs and two rocks, La Balea and Le Cavallo, yet there is a sufficient passage for large vessels entering the river, and that it has not less than 18 feet of water. This passage is very narrow, but the pilots say that it is the best.

The best anchorage is said to be without the entrance, in 12 or 13 fathoms, with the college at Victorio in a line with the northern base of Monte Moreno. Here you will have a bottom of oaze, good holding-ground, and be a mile without all danger; and be also in a line of direction for proceeding upward, with the assistance of a pilot.

To the southward of the Pacotes are the islets and rocks of Jien, and at 12 miles more to the southward are the Guarapari Islets, between which and the

land is a passage for small vessels ; and all may approach to the eastern side of them, for there is a depth of 7 fathoms. Farther south, about 3 miles, are the low islets named the Razas, and farther on is the Islet Calvada, distant 4 miles from the coast. Large ships may pass within the Razas and Calvada, the depths being from 18 to 11 fathoms.

To the west of the Islet Calvada is the River Guarapari, which falls into the sea between two woody hills. The coast hereabout, and to the northward, is of moderate height, nearly covered with small trees, and having, at certain distances, low yellowish cliffs, which are not found to the southward of the point of Benevente, which is 14 miles S.W. from Guarapari, in latitude $20^{\circ} 53' 50''$ S. S.W. by S., distant 5 miles from the Islet Calvada, the soundings are irregular, and there is frequent occasion to haul out, in order to keep a depth of 12 fathoms ; such soundings extend out about 4 miles to the S.S.W., and the water about them is discoloured. The least depth found was $6\frac{1}{2}$ fathoms, and danger, if any, will show itself plainly, for the water shoalens very suddenly from 12 to 8 and 6 fathoms.

About 4 miles from shore, in latitude $20^{\circ} 58'$ S., is Francesa Islet and Reef, which latter has 7 fathoms close to it ; it stretches about a quarter of a mile from the N.E. point of the islet. Between the islet and the main the depth is not more than 3 fathoms, shoaling gradually, with a hard bottom. There is anchorage in 7 fathoms, sandy ground, with the islet N.W. by W. $\frac{1}{4}$ W., three-quarters of a mile.

S.S.W. $\frac{1}{4}$ W. from Francesa, distant 6 miles, is Egg Islet, with reefs extending about half a cable's length from the N.E. and S.W. points. Between it and the land are $5\frac{1}{2}$ fathoms, sandy bottom.

At nearly 7 miles S.S.W. from Egg Islet, and 5 miles from the shore, is a sand-bank of 4 fathoms, having 9 and 10 fathoms on each side of it, but shoaling gradually toward the land. Its length is about a mile and a half N. and S. by one quarter broad. Off Point Murubu there is an appearance of breakers at two miles from land. The soundings off Point Murubu are very irregular, 13 to 9 and 6 fathoms ; the water thence deepens suddenly, with a hard rocky bottom ; at 10 leagues S.E. from this part of the coast there are 20 to 22 fathoms, bottom of very fine white sand, but hence toward the shore on the west, and toward Cape San Thomé, it gradually becomes coarser and more regular.

CAPE SAN THOME.—From Point Murubu to Cape San Thomé, in latitude $22^{\circ} 2'$ S., the coast is generally a low sandy beach, thickly covered with brushwood, having here and there a stunted tree. The Morley Bank lies to the north-eastward of Cape San Thomé ; it is a rocky bank, of an oval form, and 4 leagues in diameter ; the general depth of water on it is uncertain, but on one spot only three feet were found. There is a passage between it and the land.

From the River Parahyba do Sul, on the parallel of $21^{\circ} 37'$, northward to latitude 21° , the coast gradually heightens, and has several remarkable hills inland ; but in 21° the beach is not more than from 30 to 40 feet above the level of the sea. In about $21^{\circ} 10'$ are three remarkable red cliffs, close together, the largest being to the southward. In about $21^{\circ} 28'$, at some distance inland, is a remarkable sugar-loaf hill, tapering to a fine point or peak at the summit.

From the parallel of 21° to $21^{\circ} 10'$ the soundings are very irregular near the shore, frequently altering 3 to 4 fathoms at one cast of the lead ; at six miles from land, 5, 7, 10, and 13 fathoms have been found. Hereabout the great bank of soundings appears to be steep on the outside, deepening suddenly from 26 fathoms to no ground at a depth of 100 fathoms. In all the

space of 9 or 10 miles over these irregular soundings the bottom is of rotten stone and coral, changing, on the outer edge, to coral and shells.

On approaching Cape San Thomé the soundings are very regular, over a sandy bottom, and on nearing the shoal the ground becomes finer; a few casts of mud may be found, but the bottom, generally, is of fine sand. The eastern extremity of the shoals of San Thomé, having $4\frac{1}{2}$ fathoms, appears to bear from the cape between E. and S.E., 7 or 8 miles. H.M. Ship *Jaseur*, Captain Martin, in November, 1825, crossed in the last-mentioned depth, and a native sumach, about a mile and a half within, from that ship, had 4 fathoms. The least water found upon this shoal was 3, $3\frac{1}{2}$, and 4 fathoms.

In $4\frac{1}{2}$ fathoms, and close to the breakers of Cape San Thomé, the current has been found so very strong that a ship with difficulty got out again. In $3\frac{1}{2}$ fathoms, to the southward, the water was so much agitated, and the current so strong over the breakers that even a small vessel could not attempt it without danger. A ship falling in with this part of the coast, during the months of April, May, and June, may make toward the land in safety, only taking care not to enter into less than 10 fathoms, when off the cape, as it is probable that there will be a current setting south-eastward, at about two-thirds of a mile in the hour.

In the vicinity of Cape San Thomé there appear to be some shoals so that it would seem that this port has not been very closely examined. The following is an account of soundings by His Imperial Majesty's frigate, *Principe Imperial* :—

“On the 29th November, 1834, when steering S.W. by S., in the latitude of Cape San Thomé, and longitude $40^{\circ} 30'$ W., we sounded at 3 a.m., in 32 fathoms; at 3h 15m., in nine; and 3h. 20m., in six, and a half five. The ship running between five and six knots, a dark squally morning, with all sail set. No time was lost in shortening sail, and the small-bower anchor cut adrift, when we found ourselves in half four, the frigate drawing 22 feet, and a heavy swell on at the time. At daybreak, the shoals of San Thomé, breaking very high, bore W. by S., distant one mile. At this time it cleared away, and we could see nearly 30 miles from the mast-head, but no land was to be seen.

The following day we had excellent sights for the chronometers, near Cape Frio; consequently there is no doubt that these shoals extend upwards of 30 miles off.

On the ship running out E. by N., at the rate of two knots, for three hour, we found the soundings very irregular, from 5 to 7 and 8 fathoms, and then lessening to 5 and $4\frac{1}{2}$, sand; and we got soundings off the shoals in 26 fathoms, having run off at least 20 miles.”

The position of the frigate according to the above longitude will be about 20 to 25 miles from the cape, at which distance no shoal water is marked on the charts; it will, therefore, be necessary when rounding the cape, not to approach it too closely, and not to get to the westward of 40° while near its parallel. It should be remembered that the cape is low.*

* A correspondent in the *Nautical Magazine*, 1842, page 801, expresses himself as follows :—

“It is always advisable to pass the parallel of Cape Thomé with due caution. At the same time I feel satisfied that no shoal on which a vessel could ground, and over which the water would break, lies so far from the land as the one mentioned on the authority of the officers of the Brazilian frigate, *Principe Imperial*. With a foul wind I stood in on the parallel of the shoal with the lead going carefully and regularly. The soundings were not very regular, but we carried deep water far within the position where the shoal is represented to be, and with a good look-out could see nothing indicating a shoal, although there was a fresh breeze blowing at the time. I also, when at Rio Janeiro.

Besides the above, soundings have also been obtained by Captain Jervis, of H.M.S. Pilot, on Dec. 6th, 1849 :—"Running for Rio, found the water very much discoloured, sounded in 35 fathoms, sand; at 10h. sounded in 25 fathoms; at noon lat. $21^{\circ} 44'$ S., long. $39^{\circ} 35'$ W., then $16\frac{1}{2}$, shoaled the water gradually, until we had in the starboard chains 15 fathoms; in the port chains barely 9 fathoms. This continued until 4h. *p.m.*, and then shoaled to half 12 fathoms, going three knots, breeze increasing, then deepening to 16 and 17, and shoaled again to $12\frac{1}{2}$. At 4h. no bottom with 20 fathoms, at 5h. leadsman in. Lead hove every half hour till midnight. Cape Frio bearing at noon S.W. by W. $\frac{1}{4}$ W., 140 miles; Cape San Thomé W. $\frac{1}{4}$ S., 80 miles; Espirito Santo N.N.W. $\frac{1}{4}$ W., 109 miles." There is no shoal laid down on the charts in the above position, although the soundings show the ground to be very uneven.

Another bank has been recently discovered off this cape (September 5th, 1849), the position of the north-east edge of which is lat. $20^{\circ} 28'$ S., long. $37^{\circ} 25'$ W., and the south-west edge lat. $20^{\circ} 56'$ S., and long. $37^{\circ} 56'$ W. Commander Powell of the U.S. ship John Adams, who discovered it, ran across it for the distance of 43 miles, on a S.W. course, taking soundings from time to time, in a depth of 35 to 64 fathoms on a bottom of gravel and coral.

ST. ANNE'S BAY is formed between Cape San Thomé and Cape Busios, and is deep and spacious; in rough weather the surf is violent, and the broken water runs up a long inclined plane. Within the bay at the distance of 15 leagues from Cape San Thomé, are three islets, named the Isles of St. Anne: these, seen from S.S.W. and N.N.E., appear united. The southern isle is the highest, and the lowest is to the east. Between them and the main the channel is so safe that you may here repair any damage, and careen the vessel, if required. The depth, to the southward of the isles, at 4 or 5 miles from the land, is from 17 to 27 fathoms, oazy bottom.

Off the N.E. part of St. Anne's Islands are several barren rocks; and on the N.W. side of the isles is anchorage, in 7 and 8 fathoms, well sheltered from Easterly and S.E. winds, but exposed to the S.W. and N.E., but with the latter there is seldom much swell. The proper route to this anchorage is by the S.W., through a clear passage with 10 and 12 fathoms close to the islets, near which is the deepest water.

In the southern part of St. Anne's Bay the shore is covered with shingles, and when it meets the high rocks beyond the River Una, in the S.W. part of the bay, the shore is bold, stretches to the eastward, and forms the point of Busios. Armacao, or Armazem, is the small secure bay near the mouth of the Una; it affords refuge to vessels baffled in their attempts to double the cape, and when the wind blows hard from the east. The entrance is between two small rocky islands, named the Beautiful and the Ugly. The anchorage lies south-east of the entrance. The Morro of St. Ioso is a conspicuous mark for the Bay of St. Anne; its situation is latitude $22^{\circ} 32' 26''$ S., longitude $41^{\circ} 59'$ W.

From off the north end of the largest isle of St. Anne a sand-bank stretches to the S.W. and W.N.W., with 3 to 5 fathoms over it, the greatest depth being at above half-way across the passage toward the main. This, there-

questioned several Englishmen, commanding the Brazilian steamers trading on the coast. One of them in particular, a well-informed, careful man, shewed me his chart, with many tracks well within and over the position of the shoal, and declared his firm belief that it does not exist. I would not, however, notwithstanding all this evidence, wish the shoal to be erased from the charts. Detached shoals are very difficult to find, and the navigator will do well to pass its parallel with caution, particularly in the night."

fore impedes the passage from the N.E., but the ship may beat out of the S.W. channel. Large vessels, attempting the latter, should carefully keep the S.W. end of the larger island to the eastward of S.E., because the water shoalens suddenly on the S.W. side of the bank, and likewise toward a sandy beach on the larger island. The soundings are regular about St. Anne's Isles, excepting on the bank which extends westerly from the north end of the larger island; this bank is steep-to on both sides, the water suddenly shoaling from 7 to 4 and 3 fathoms, bottom of mud, but, on the outside of the islands, sand only.

From the anchorage, in 7 fathoms, at three-quarters of a mile from the sandy beach on the large island, the bearings are the S.W. point of the large island South; the northern part of the same, E. $\frac{1}{4}$ S.; the outer point of the S.W. island, N.N.E.; and the Islet Ferro, at the entrance of Macahe River, N.W. by W. $\frac{1}{4}$ W. Large ships should bring up farther to the southward, keeping the S.W. point of the large isle about S.E., one mile, where there will be found 7 or 8 fathoms, at a sufficient distance from the shoal. There can be no difficulty in gaining the anchorage at any time, only recollecting that the passage to it, from the N.E., is hardly of sufficient depth for large vessels.

San Joao de Macahe.—The mouth of the River Macahe bears N.W. by W. $\frac{1}{4}$ W. from the largest St. Anne's Isle, with the Islet Ferro off the entrance, a barren rock, with some bushes upon it. There are two or three rocks at or about three-quarters of a mile from the islet over which the sea breaks, but there is a passage on either side. The village of Macahe is situate between the northern bank of the river and the sea beach. Its harbour is not more than seventy yards broad at the entrance, and is unfit for vessels of more than 200 tons. It used to be the case, and perhaps still is, that if a flag were hoisted it was a signal that the entrance was safe. In going in, a vessel must steer close to the south side of the rock, and, when she comes abreast of it, should let go her anchor, with about 15 fathoms of cable; if she overshoot this berth she must put the helm hard a starboard, and run between the southern point, where there is a channel 8 feet deep and 2 miles long, with remarkable clear water. A little to the south of the harbour, and close to the shore, lies a ledge of rocks, which must be carefully avoided.

The Morro of San Joao, or S. Joam, lies in latitude $22^{\circ} 32' S.$, longitude $41^{\circ} 59' W.$, and may readily be known by its insularity on the coast, and its distance from the chain beyond it in the interior. N. $\frac{1}{4}$ W. from this morro, distant 20 miles is another hill, very high, surmounted with a peak, and remarkable for its leaning towards the north: this is named the Frade of Macahe; it stands in latitude $22^{\circ} 12' 2'' S.$

Ancoras or Anchor Isles.—These islands lie S. by W., distant 21 miles from St. Anne's Isles, and consist of two islets and a large white rock lying to the southward of the inner one, and connected to it by a reef. The outer islet is 5 miles E. by S. from Cape Busios, and between the isles is a channel of 23 fathoms; the easternmost island resembles a cardinal's hat. Small vessels may pass between these islets and the land, and it is said by the pilots that the depth of water, in the passage, may allow vessels of every class to pass through.

To the northward of Point Busios is Branca, or White Isle; then follows a beach of sand, which ends at the Morro of St. Joao, or Joam, with two or three small rivers, and the Islet do Ferro, a barren rock with some bushes upon it, as before described.

PAPAGAYOS BAY.—Between Cape Busios and the Isle Frio is Papaga-

yos or Parrots' Bay; the bearing and distance between the extreme points of which are S.S.W., 14 miles. A great portion of the bay is occupied by a group of islets and rocks, which do not appear to have been accurately surveyed. About 6 miles to the northward of the Isle Frio, and at the north end of a low sandy beach, are a small fort and flag-staff, on the south side of the entrance of a little river which falls down from the village of Papagayos.

CAPE FRIO is a high and rugged promontory, the south-western extremity of an isle bearing the same name, which forms on its N.W. side, a convenient harbour. Frio Island is nearly three miles in length from N.E. to S.W., by one mile in breadth, and may be seen, in clear weather, at 15 leagues off. When bearing from the east or west it presents two mountains, the southern being the smallest both in height and breadth. On a N.N.E. and S.S.W. bearing these mountains seem to form one mass, with a double summit like two small points, and at the same time will be seen a little conical islet, at one or two cables' length to the E.S.E. of the cape.

On Cape Frio (we presume on the island) there is a lighthouse showing a light revolving every 2 minutes, at an elevation of 1000 (?) feet above the sea, visible about 41 miles. The eclipses are of equal duration.*

PORT FRIO.—This harbour is commodious, and secure against all winds, excepting N.E., but even with the latter you may be sheltered by the little isle Dos Porcos, which lies on the north side of the entrance. The harbour is more than a mile in extent each way, and its depths are from 19 to 4 fathoms, but in the centre are 12 to 16 fathoms. Its great entrance is at the east end, on the south side of the elevated islet, Ilha dos Porcos; this entrance is about two-thirds of a mile wide, and its depths are 25 to 15 fathoms, bottom of fine sand and mud. The entrance from the S.W. is very narrow, but has a depth of 10 and 12 fathoms, and there is anchorage almost immediately within it for large vessels, in 7 to 10 fathoms; farther in is a bar, on the shoalest part of which are only 10 and 11 feet, so that this passage is only fit for small vessels. A small fort, with four guns, stands on a rocky point between two sandy coves, on the N.W. side of the harbour, and entirely commands the principal entrance to the anchorage. A little within this fort is a village, occupied chiefly by fishermen. Water may be had from wells in the coves on the North and N.W., as well as on the island, near its west end, where huts may be seen. The tide flows here, on full and change days, until 9h.; and its vertical rise is about 4½ feet.

Cape Frio is the most remarkable headland, as well as the most important land-fall, on this part of the coast. From off this cape to the Sugar-loaf, on

* There is considerable doubt about the particulars of this light, and it certainly can seldom be seen at more than 20 miles off. In the *Nautical Magazine*, for 1842, are the following remarks, which we add, as they supply an additional motive for caution when sailing in the vicinity of the cape:—

“Running down towards Cape Frio, it is advisable to keep about ten miles to the southward of its parallel, in order to prevent getting into the bay to the northward of that cape; and at night no one must trust to see the light at any distance, it being placed so high as generally to be enveloped in the thick fog, or haze, which hangs over the high land, particularly in summer. I made the land of Cape Frio in the night, running in with the lead going. We struck soundings, and saw the land long before the light, and it was only when very close, that it could be discerned twinkling through the haze. Even when seen it was very much doubted whether or not it was a star. Many have made the same remark respecting the light, and it has been represented to the authorities. It is rather surprising, therefore, that they have not altered its position; the expense of removal, however, and the cost of re-erection are, I presume, serious obstacles with a poor government.”

west side of the entrance to Rio Janeiro, the course, by compass, is nearly West, and the distance 21 leagues. The land between is low and sandy; but at a distance from the beach, it rises to a series of elevated and barren mountains.

Vessels bound to Rio Janeiro, when approaching Cape Frio by night, with the wind Easterly or S.E., must be cautious not to run into the bay to the northward of the cape, such mistakes having proved fatal to many ships: this, however, can never happen while the light on the summit of the island is visible. A considerable swell sets in with E.N.E. winds, which are most prevalent.

CAPE NEGRO, to the westward of Cape Frio, distant 12 leagues, is covered with a dark verdure, so that it may be readily known; and, being steep-to, may be approached with safety. Within three miles of it the depths are from 18 to 27 fathoms, bottom of soft ooze. Two islets, named the Maricas, at the distance of 13 miles S. 79° W. from Cape Negro, and 38 miles west from Cape Frio, at 3 miles from the coast; they are of moderate height, steep-to on the south side, and may be approached safely. If, on the approach of night, or under particular circumstances, a vessel cannot reach the entrance of Rio, she may advance to and anchor here. Off the western side of the islets H.M.S. Jaseur, Captain Martin, anchored in 17 fathoms, coarse sand and mud, with the rock off the southern island bearing S.E.; the passage between the isles, E.S.E.; the northern end of the isles, E.N.E. $\frac{1}{4}$ E., and in a line with Cape Negro. Between the islands and the main are 13, 11, and 10 fathoms, close up to the beach.

As this place is sheltered from the S.E. round by the North to W.N.W. and more West, with a fine sandy bottom, it may be considered safe, when the wind is to the northward and eastward, or to the northward and westward. On the eastern side of the isles the sea commonly breaks with great violence, so that landing there is very difficult; the best place is near the N.W. end of the larger isle. In a small sandy bay, on the low part of this isle, is a well with good water, but it cannot be obtained without trouble in getting it off.

RIO JANEIRO.—The harbour of Rio Janeiro is one of the most spacious and for its accommodation, one of the most valuable on the coast of Brazil. The entrance is narrow, but within the port widens considerably and extends northward 4 or 5 leagues. Scattered over the surface are many islands of various sizes, under shelter of which small vessels may anchor, the principal anchorage for large ships being nearer the town. The scenery in the bay is represented to be very beautiful, and not to be equalled in any part of the world.

The entrance to the harbour lies between two islets, Pay and May, on the east side, and a bold point on the west side, which is surmounted by the Tijuca, Gabia, and Corcovado Mountains; these mountains are very remarkable, and are easily recognised from the southward by their peculiar form, particularly the two latter. In front of the entrance are the islets Redonda and Raza, and within and westward of these are several other islets. From Pay Islet to Gabia Mountain the bearing and distance are about W. $\frac{1}{4}$ S., 11 miles.

The Islet Raza is low, and appears from the east like a slipper, with the sloping side northward. It is now distinguished by a lighthouse, which was first lighted on the 31st of July, 1829. The light is so elevated as to be seen about 18 miles off; it makes a revolution in every 3 minutes, and presents, alternately, a brilliant and a red light. Its situation is in latitude $23^{\circ} 3' 9''$

S., and longitude $43^{\circ} 4' 45''$ W.* At two miles W. by S. from Raza is another isle, more elevated, appearing like a haycock, and named Redonda, or Round Island.

These islands are very useful marks to vessels bound to the harbour, for a vessel bound to Rio Janeiro, should, after rounding Cape Frio, steer due West, keeping about 3 leagues from the coast, until she makes Redonda, and which will be descried before Raza can be seen, although the latter lies two miles more to the eastward. Currents, at times, set along the coast, either East or West, according to the winds.

The Mountain La Gabia is situate about 3 leagues W. by S. from the entrance of Rio; its top appears to be flat, and rather larger at its summit than a little way below, which gives it the appearance of a ship's top: hence it cannot be mistaken for any other mountain, and it is the best object for distinguishing this coast, particularly as it can be seen from all points of the offing between the East and S.S.W. At about N.E. by E. from the Gabia, distant 8 miles, is the Pao de Assucar, or the Sugar-loaf, a conical mountain of rock, on the western side of the entrance to Rio Janeiro. This rock has been generally considered as the beacon which serves to mark that entrance, but, it being much lower than the Gabia, it is not seen at so great a distance.

It is prudent, in general, to keep at some distance from the coast which connects Rio Janeiro with Cape Frio, because, when the wind blows from S.W. to E.S.E. by the south, the swell is incessant, and in rough weather it renders the anchorage very unsafe. You should not approach the islands, situate at the entrance of Rio, until the sea-breeze is well set in, and then you must manage to reach an anchorage before night. Without this precaution you will be exposed, by stopping among the islands, or at the entrance, during the calm which intervenes between the sea and land breezes, or encounter the latter, which directly opposes the entry, and is very often accompanied by gusts of wind, which are sometimes violent, more especially at the full and change of the moon.

If, notwithstanding all precautions, the land-breeze should set in before you have entered the harbour, and your vessel sails badly, or if the current, which almost always sets outward, will not allow you to reach the inside of the bay by tacking, it will then be more advantageous to remain outside of the islands than to anchor among them. The space for tacking is very limited, especially during the night; the ground is hard, and the swell of the sea is the stronger and more troublesome the nearer you are to the entrance. The strongest gusts of wind from the land-breezes seldom extend farther out than to Redonda, or Round Island.

On ENTERING and LEAVING the HARBOUR.—The passage generally preferred, on entering and leaving the harbour, is that between the Isles Pay and Raza. In the channel between are from 21 to 11 fathoms, bottom of grey sand. Should you enter at a mile to the west of Raza, or midway between Raza and Redonda, you will have the western point of Pay nearly N.E., and a direct course thence N. $\frac{1}{2}$ E., $7\frac{1}{2}$ miles, will carry you to the west of the fortress of Santa Cruz, which stands on the eastern side of the entrance. On this track you leave, at a distance to the west, several islets and rocks lying to the N by W. of Redonda, and pass about half a mile to the east of the Islet Catanduba, or Tucinho, lying nearly a mile to the south of the Sugar-

* The position of this light, deduced from the position of Na Sa da Gloria, given by Baron Roussin, is long. $43^{\circ} 13' 39''$ W.

loaf. In this route the soundings decrease gradually from 24 to 7 fathoms, bottom of fine grey and white sand, stiff ground. There is no danger, and nothing to avoid but what may be seen.

At the entrance of Rio the least depth of water is $6\frac{1}{2}$ fathoms; having passed this the depths increase rapidly; in one cast of the lead you may have from 11 to 14 fathoms, very near the battery of Santa Cruz. You may safely approach still nearer to the opposite side, but the first direction is the most followed, it having the treble advantage of leading a vessel near to the fortress, of answering the signals made therein, and of keeping clear of the little Isle Laage, with its fort, on the opposite side of the channel. Thus, also, you will avoid the effect of current, which sometimes runs to the N.W. when the tide is rising. The passage between the fort of Santa Cruz and that of Laage is the only one frequented; that between the latter and Point St. Joao is never used, not from want of depth, but because it is narrower, and exposed to shifting winds from about the Sugar-loaf and other high lands. Here, also, the current is irregular, and the ground rocky.

From about three cables' length off from Fort Santa Cruz, the direct course to the anchorage for ships of war is N. 32° W. (N. 35° W. *true*) until you are E.N.E. of the Fort of Villegagnon, which you pass safely at the distance of three cables. From this spot you will steer for the Ilha dos Ratos, or Rat Island, and having now arrived before the city, you may choose your anchorage in from 19 to 10 fathoms, bottom of mud; only observing not to bring the Sugar-loaf to the westward of Fort Villegagnon. The best place for ships of war is to the E.N.E. of the palace, to the south of an imaginary line from Rat Island to the principal church of the city, in from 14 to 18 fathoms; here you will avoid a small rocky bank, lying at $2\frac{1}{2}$ cables E.N.E. of Rat Island. The anchorage for merchant ships is to the N.E. and adjoining to the city, the larger ones arrive at it by passing the Isle Cobras, (the fortified island to the west of Rat Island) and are separated from the Men-of-war road by a shoal bank, on which the sea breaks, at low water, spring tides, when the winds from the offing are violent.

Vessels commonly moor north and south, in the bay of Rio Janeiro; but it seems preferable to moor N.E. and S.W.; this direction, being nearly that of the flood and ebb, renders it easy to lay the vessel athwart the land and sea-breezes, which are almost the only predominant winds. This will, in summer, be found necessary, for at that season the heat is, at times, almost insupportable. A hawser, carried alternately from one buoy to the other, according to the wind, will gain this advantage; the flood-anchor to be on the port, and that of the ebb on the starboard side.

The tides are not regular, or of equal duration, as the ebb generally runs much longer than the flood, more especially after heavy rains. The ordinary velocity of each rarely exceeds seven-tenths of a mile in the hour, but, at times it may run at the rate of a mile and three-tenths, principally during the ebb. The time of high water on the days of full and change is at three quarters past two, and the vertical rise $4\frac{1}{2}$ feet, neaps only 3 feet.

On *leaving* the ROAD of Rio Janeiro the most simple precautions only are required; it will be sufficient merely to attend to the land-breeze and the ebb-tide, allowing them to carry you along; even the ebbing is not essential if the breeze has that strength which it usually acquires during certain hours daily.

To be better prepared for getting under-way, vessels frequently, on the evening before their departure, get on the side of the bay which faces the town, by which they avoid any obstruction in the Road, properly so named; and some take advantage of the strength of the land-breeze, but this is not

really necessary, for a vessel may easily set out from any part of the usual anchorage.

The route for going out is the same as that for entering: passing at three cables' length to the east of the Isle Villegagnon, and at the same distance on the same side of Fort Laage, and ranging within hail of the fortress of Santa Cruz, taking care, in this tract, to keep over to the eastern side rather than the other: these are the only requisite precautions.

As you generally weigh anchor in the morning, it is probable that you will have the advantage of the land-breeze at least four hours: this will enable you to pass all the isles in the bay, and having arrived here you may tack according to circumstances. Should you experience a calm, between the land and sea breezes, before you get without the islands, it will be proper to anchor, choosing a favourable position, so as to get under-way again with the first breeze that ensues.

OTHER DIRECTIONS.—Captain Hewett gives the following directions for the harbour of Rio Janeiro:—

“The immediate entrance of the harbour of Rio is known by two lofty peaks, one on either side; the western resembles a sugar-loaf; it bears that name, and differs from every other on the coast (for there are many) by the inclination of its summit to the westward.

If night be too far advanced a preference ought to be given to remaining under weigh, rather than to anchoring without the harbour, the ground being rocky, and much exposed to a heavy rolling swell, which increases as it approaches the bar, the shoalest water on which is but $6\frac{1}{2}$ fathoms. The certainty of the sea-breeze before noon of the following day, and the tempestuous and general violence of the land-breeze, accompanied by heavy rain, &c., particularly at the full and change of the moon, render necessary the precaution of standing off and on, from and to Round Island, for to it the violence of squalls seldom extends.

The *Flood-tide* in the Harbour is of shorter duration, and of less force than the ebb, against which and a strong land-breeze our ship, the *Inconstant*, turned in, to the astonishment of the Portuguese; an effort never before attempted. After violent rains the rise of the water in the harbour has very little influence over the ebb-tide, except diminishing its strength. The ebb has been known to run a whole day without intermission; the current strongest on the western side, but an eddy flood will sometimes be visible on the eastern side, when the water is discovered to rise.

The entrance of the harbour, between the forts Santa Cruz and St. Joao is, in breadth, three-quarters of a mile. The passage between St. Joao and Laage or Square Island, situated immediately in the entrance, should never be attempted, although the greatest depth of water is to be found there; the narrowness of the channel, the likelihood of the wind's becoming variable under the Sugar-loaf, the irregularity of the tide, with the rockiness of the bottom, if compelled to anchor, render it dangerous, if not impracticable. The true channel is on the eastern side of Laage Island, to abreast of which, from the bar, the water gradually deepens from $6\frac{1}{2}$ to 21 fathoms; and when a little past it, the ship's head being N.N.W., soundings are lost for a short time, with the common hand-line.

Leaving the Fort do Villegagnon, (also on an island) on the left hand, the best anchorage is obtained, for vessels of war, abreast the city, with the flag-staff of Villegagnon just open to the westward of the Sugar-loaf; by taking this precaution a small bank very dangerous for cables, will be avoided. *This bank is situated about $2\frac{1}{2}$ cables' length from Ilha dos Ratos, or Rats' Island, in an E.N.E. direction; it is circular, about a cable's length in*

diameter, and very rocky; the mark for 4½ fathoms, which is the shoalest water, is Ilha dos Ratos and the great church in one, and Villegagnon flag-staff on with Theodosia Battery, on Point S. Joao; so that its vicinity to Ilha dos Ratos renders precaution necessary in mooring. The best bower, with a good cable, should be laid down to the westward, in order to preserve an open hawse to the entrance; a stream-cable bent on to the small bower-anchor, and taken in at the stern-port, will preserve a free circulation, both from the land and sea-breezes, and the ship's head will thus be directed to the only points of the compass from which the wind can be expected to blow fresh, and which are from N.N.W. to S.W.

Merchants' Road.—A bar of sand, with some rocks, extend opposite to the city, the outer edge nearly in a direct line from Villegagnon to Ilha dos Ratos, and ending at the N.E. point, Ilha dos Cobras: this bar is passable for boats only, but within it all merchant-vessels, that there is room for, discharge and take in their cargoes; the only passage to it is around the north end of Cobras, near which are the arsenal and Brazilian vessels of war."

ANOTHER OFFICER says—"In entering the harbour take care to pass within hail of Fort Santa Cruz, in order to answer any questions that may be asked. There is plenty of water close to the rocks. Then proceed up to Fort do Villegagnon, below or opposite to which, bring-to, or come to anchor, and allow no boats to come alongside but those of the government, until you have received *pratique* when you will be permitted to proceed higher up the harbour, round the east end of the Isle Cobras, to the place of anchorage for merchant-ships.

There are no pilots to be met with off the coast or harbour, for, as there is no hidden danger, they are not requisite. Whilst the sea-breeze is strong enough to enable ships to overcome the ebb, they may safely enter by night or by day; but on entering at night the Fort Santa Cruz makes a signal to the city, which is not to be understood as interfering with the vessels entering.

The port regulations require all vessels to bring-to a little below Fort do Villegagnon; and any one attempting to pass, before she has been visited, will be fired at, and the commander liable to imprisonment, besides paying a fine for each gun so fired.

Besides the lighthouse erected on the Isle Raza, a small light is or was put up every night in the Fort of Santa Cruz. It has been noticed that the time of high water is at 2h. 30m. p m., but it seems very uncertain."

The PORT REGULATIONS of Rio Janeiro, in 1825, were as follows:—
"When a vessel arrives a military guard is put on board, the different government boats visit, and the custom-house boat calls alongside, to know whether the vessel is bound to Rio, or has only put in for supplies. If bound for Rio a strict search is made in the cabin and fore-castle, and all parcels found are carried to the custom-house, whence they may be taken, after paying the duty. The hold is then sealed up, and the captain allowed to go on shore to enter, having previously sworn to his manifest or cargo-book, and signed a declaration in Portuguese, of his detention. If his manifest clears the vessel for Rio, she must be entered in full, and pay duty on all her cargo; if for any other part, a time is allowed her to get supplies, and her hatches are not sealed. If she has a cargo to land she is sealed, and enters in *franquia*, which allows the privilege of landing and selling part of her cargo, only paying duty on the part landed.

If, by any mistake in the interpreter, the captain declares, in the declaration in Portuguese, that he is bound for Rio, although his manifest may show that his vessel is bound to another port, there is difficulty in getting

entered in *frankia*. Vessels are allowed but one discharge a day, and often are prevented from discharging, by want of room in the custom-house, or want of guards to attend to the discharge. After a lighter is loaded the hatches are immediately sealed, unless permission is previously given to the officers to remain, to allow the cargo on board to be stowed, and the vessel's hold to be put in order; for such courtesy a fee is exacted, which, if not given, much trouble and inconvenience may arise, as they are arbitrary in their office, and no redress can be had by complaining, the word of the lowest guard having more faith given to it than that of the most respectable shipmaster. Three officers are sent on board to attend to every discharge, and if one of them fails in appearing no discharge is allowed.

Vessels cannot begin to discharge before daybreak, and the captain is bound to send his boat in time to take off the officers from the shore, or furnish another for that purpose. The expense of the guards, at each discharge, is about 4 dollars 80 cents., that is the customary fee to secure their civility—a practice of long standing, though pretended to be denounced by the judge or chief of the custom-house, and which merchants cannot avoid paying, without exposing themselves and their business to difficulty and inconvenience. All lighters, with merchandise, must be at the custom-house by seven or eight o'clock in the morning; and, as vessels lie off in the bay, small discharges only can be made at a time. Vessels loaded with dry goods are often delayed from ten to fourteen days between each discharge, without an opportunity of discharging or waiting in their turn.

Goods, although manifested, if found in the fore-castle, or anywhere out of the hold, or not under seal, are liable, by the regulations, to seizure."

DIRECTIONS FOR RIO JANEIRO, for vessels approaching from the southward, by the **BARON ROUSSIN**.—"The approach to Rio Janeiro is generally, as we have shown, by Cape Frio, which is admitted to be correct, during the *northerly monsoon*, and when advancing from the *northward or eastward*; but, under other circumstances, it will be disadvantageous, by losing time and prolonging the voyage.

For vessels from the *southward*, and during the *southern monsoon*, the *Ilha Grande*, the *Morro of Maramba*, and above all the *Gabia*, in the west, are the best objects of recognisance, as all these may be seen at a sufficient distance to serve as a guidance on the route, and an estimate of the distance to the anchorage.

On advancing, another good indication is the peculiar figure of the land, between the *Gabia* and *Sugar-loaf*. When coming in from the offing, between the E.S.E. and S.W., the configuration of their summits presents, in a very remarkable manner, the figure of a man lying on his back from W.S.W. to E.N.E.; whereof the *Gabia* forms the head, and the *Sugar-loaf* the feet. When the tops of these mountains are free from clouds or mists, it is impossible not to be struck with this appearance.

The *Gabia*, as already noticed, is situated at about 3 leagues W. by S. from the entrance to Rio Janeiro. Its summit appears flat and rather larger than the surface below it, and which gives it the appearance of a ship's top. This mountain and the *Sugar-loaf*, at 8 miles to the eastward of it, is described elsewhere.

On approaching Rio Janeiro, from the southward, soundings may be obtained at a considerable distance from the land, but at a great depth. At 10 to 15 leagues off they vary from 60 to 80 fathoms, and diminish gradually to the coast; the bottom is a mixture of sand, gravel, broken shells, rocks, and oaze or mud."

A CORRESPONDENT OF THE NAUTICAL MAGAZINE FOR 1842, who signs himself *Mexicano*, has made the following remarks :—

“ Approaching the entrance of the harbour of Rio Janeiro no difficulty is met with, in ascertaining the vessel's position, from the very conspicuous land in the neighbourhood of the harbour. The Sugar-loaf Hill, on the left hand side of the entrance, forms the most conspicuous object, and renders the approach easy, and without danger. The regular winds in the harbour, and for several miles outside, are a land and sea-breeze; the former giving place to the latter, at from 9 to 11 h. a.m., after this time, therefore, there is generally a fair wind for entering. After passing the Pay and May Islands, in the entrance, two forts will be seen, one on the starboard hand in entering, named Santa Cruz, the other named Fort Laage, situated on a small island almost immediately opposite. Passing between these two forts,—the harbour regulations require the vessel to be carried within hail of Santa Cruz, in order that the master may, in passing, give the name of the vessel, the port from whence she came, and the number of days passage.

These questions being answered, and passing on upwards toward fort Villagagnon, situated about half-way between the entrance and the city, and on the port hand, it is necessary to shorten sail in time, as the vessel must be anchored previous to coming abreast of the fort, otherwise guns will be fired, for each of which the offenders must pay. While anchored here the vessel will be visited by two boats, one from the fort, the other from the custom-house, which visit being passed the master may proceed with the vessel to the customary anchorage, above the Island of Cobras (which is easily recognised on the port hand, from the plan on the chart), and then anchor amongst the vessels as soon as possible, and with a short scope of cable, the holding ground being good, and no risk of driving. If the vessel has a stream-chain she will be quite safely moored with one bower and the stream-anchor, which is easily weighed.

There are two ways of discharging cargoes in Rio Janeiro; one by putting the vessel on a list at the custom-house for her turn at the wharf, and the other by discharging in lighters, the vessel paying the lighterage. As regards dispatch, from all I could see, the former plan is the best, although far from good. Generally speaking a vessel lies in the harbour 10 days previous to being in turn; she may then be hauled alongside a small jetty at the custom-house stores, inside the Island of Cobras, and, during fine weather, discharge cargo, being allowed to work, on an average, four hours every day. Only three vessels can discharge at the same time, the jetty only allowing this number to lay alongside. The vessel is moored here with one bower on the stream, the stream anchor on the off side quarter, and two on-shore warps; hauling off every day, after discharge, about 10 yards, and hauling in on the morning to within 3 or 4 feet of the wharf.

No custom-house officer remains on board the vessel, neither are any places on board sealed up. A strict watch is, however, kept from several guard-vessels and boats, which latter are constantly rowing about. The shore is also well watched, and the master must be particularly careful, as the fines, imposed for contravention of the custom-laws, are enforced, and the property confiscated. While the vessel has inward cargo on board, and until she has discharged and cleared, no person, not belonging to the vessel, can come on board without a written order from the custom-house; neither can any trifling article be removed from the vessel, even for repairs, without a permit. A permit is also required for every thing taken on board,—I knew a chart to be seized, which a master was carrying openly on board his vessel, after having purchased it on shore.

It generally occupies from 14 to 21 days to discharge a vessel of about 800 tons, after she is at the wharf, and when the cargo consists of bales and cases of manufactured goods. I have never, in any part of the world, seen a worse regulated custom-house than that at Rio Janeiro; every possible inconvenience must be submitted to by the shipmaster. He himself should carefully superintend the discharge, and the mate should be most particular in his account, comparing every day, when the discharge is finished, with the landing officer's account. Bales and cases are often said to be missing, although landed; when in the stores, even the merchant often cannot find his goods for months, and, in some instances, never succeeds in meeting with them. Peculation and robbery are openly carried on by men in the custom-house department. I brought forward evidence to prove that two bales were broken open, and part of the contents abstracted, by the marker of the goods himself, on the wharf; yet the party continued in his employment, his superiors evidently being cognizant of the robbery, and participators, no doubt, in the proceeds.

The shipmaster, previous to leaving England, should not receive coals, iron, or lead, as ballast, if he can avoid it; they are not allowed to be discharged at the wharf, and cause infinite trouble in removing the vessel, &c. Iron, particularly, actually costs more to the vessel to land it than the freight amounts to; an officer must be got and paid, lighters must be hired, and the iron carried through the surf on the beach,—then comes the receiver declaring it damaged, &c. Crates and bale goods are the best cargo for dispatch; coals as a whole cargo are easily landed, the vessel proceeding at once to a wharf, and discharging from 25 to 30 tons per day.

It is very seldom that return cargoes to Europe can now be procured in Rio Janeiro,—even in the coffee season, that commodity is generally shipped in foreign vessels, at low freights; their low, prime cost, and lessened expenses enabling them to carry cargoes at less freight. Every vessel ought, therefore, to have as much ballast on board, in England, as the broker will allow, or the cargo permit, as it is an expensive item in the vessel's account in Rio. Altogether this is a very expensive place for a vessel discharging a cargo; the anchorage alone amounts to 30 reis per ton, per day, for 50 days. If the vessel remains longer than 50 days there is no further payment; but if she be cleared, at the custom-house, previous to the 50 days, and afterwards detained by foul winds, or other unavoidable circumstances, the additional anchorage must be paid up to the moment of sailing, before the vessel can pass the ports. It is also said that this tonnage duty is about to be increased. For the calculation of this tonnage duty, every vessel is measured by an officer of customs, according to some rules, which must be peculiar to Rio Janeiro, and suitable to the impoverished state of the finances; as measured by it, the vessel is always made to be a greater number of tons measurement than she can carry tons of dead weight. Another charge, most unjust in its principle, and illiberal in its adjustment, is a duty charged on all provisions on board the vessel, such as beef, pork, flour, bread, &c., beyond a small quantity allowed the crew, according to a scale calculated at a certain number of days from Rio Janeiro to the port for which she clears at the custom-house. The quantity allowed to each man is almost too little to keep him in existence; neither is any allowance made for a residence in the port of destination, or the homeward passage to England. Moreover, I decidedly deny the right of any foreign power to charge a duty on provisions purchased in England, and actually necessary for the supply of a vessel's crew, during her intended *voyage*, wherever that may be; and particularly so long as there is no trading, or intention to trade with them, in Rio Janeiro. I cannot conceive for what

purpose a British consul and minister are retained at the Brazilian court, if not partly to protect British interests; yet this iniquitous overcharge on British vessels has been represented to ~~them~~ times out of number, and still is allowed to exist. I would advise every shipmaster to pay this overcharge under protest, lodging that protest with the consul, and I trust that this representation of the injustice of the charge will meet the eye of some one who has time and opportunity to obtain redress. Altogether the charges are high, and the detention great, in Rio Janeiro, and every one will do well to take these matters into consideration when chartering a vessel for that port.

In chartering vessels for Rio Janeiro the brokers generally insert in the charter-party, that the vessel must be consigned to their agent, and pay the customary commission. I would recommend every one to erase both these clauses, previous to signing any charter-party, as they are unjust in their principle, and prejudicial to the vessel's interest, although the British merchants, in Rio Janeiro, are generally highly respectable; still when they are perfectly secure of consignments, the vessel's interests are not so well attended to. They always charge a commission on the whole amount of freight inwards, although the greater part of the sum is invariably paid in England, and never passes through their hands at all. This is a manifest overcharge, the only commissions they can in justice demand being on the amount of disbursements and also the amount of freight payable in Rio Janeiro.

Vessels calling for refreshments only, and not discharging cargo, are allowed to enter the harbour without paying port charges;* and from the extent of the market, and the facility of filling water from tank-boats, I consider Rio Janeiro decidedly preferable to any port on the coast.

No description of the beauties of the scenery, in the harbour of Rio Janeiro, and its vicinity, has, in my opinion, done justice to their merits. In fact, I cannot think any description can convey an adequate idea of this splendid country; I have visited several parts of the world, and seen many specimens of romantic scenery, but none at all come up to the neighbourhood of Rio Janeiro. Every visitor will be much gratified in viewing it, and, while the vessel is waiting her turn to discharge, time is afforded the shipmaster to make several excursions. Nothing can be finer than the ride to T'sucha, to the waterfalls, round the Gabia, and back to the city by the botanical gardens; the latter are well worthy a special visit. The ride alongside the aqueduct, which conveys water to the city from the Corcovada, particularly if commenced previous to sunset, affords a view, or series of views, the most magnificent that can be conceived. Every variety of scenery is seen, the city itself is spread out before and underneath you, as in a plan; on one side every variety of hill and dale, mountain and valley is perceived, covered with the most luxuriant vegetation, and studded, at intervals, with the beautiful country residences of the merchants, with the range of mountains behind towering towards the sky, on the peaks of the Corcovada and Gabia; all these objects illumined by the glowing tints of the setting sun,—amidst the fragrant odour exhaled from the immense number of vessels,—the various sail boats,—the distant mountains beyond, with their singularly rugged outline,—the entrance of the harbour, so distinctly marked by the Sugar-loaf hill,—the white fortifications, perched on the heights around,—the men-of-war just hauling down their colours, their bands saluting the departing day with their music, its strains wafted towards you by the last faint puffs of the sea-breeze,

* We are informed that this should read "without paying anchorage dues, but are subject to pay all other port charges, besides the broker's commission and consul's fee."—April 15th, 1858.

and softened by the distance, complete a picture which cannot be excelled in any part of the world."

REMARKS BY LIEUT. SHILLIBEER, R.N., IN 1817.—The following description of Rio Janeiro, and city of St. Sebastian, from the pen of Lieut. Shillibeer, of the Royal Marines, may prove interesting:—

"The city of San Sebastian, the capital of the Portuguese dominions in South America, and residence of the Emperor, is situated on the south side of an extensive harbour, whose entrance is so exceedingly narrow, and well fortified by nature, that, with the smallest assistance of art, it could be rendered impregnable against any attack from the sea. The fort of Santa Cruz, and a very remarkable mountain, from its shape, bearing the name of the Sugar-loaf, form the entrance, at the distance of about a mile. There is a bar which runs across, but the water is, at all times, sufficiently deep to allow the largest ship to pass. Santa Cruz may be considered the principal fortification, and is, with the exception of two small islands commanding the channel, the only one in a tolerable state of defence. At the foot of the Sugar-loaf Mountain is a battery, of considerable extent, but so neglected, like several others along the shore, that it is almost become useless.

The city derives but little protection from its immediate fortifications, and the Island of Cobras, notwithstanding its contiguity, is now but little calculated to render it any.

There are wharfs and stairs for the purpose of landing at, but the most convenient is at the great square, in which the Emperor resides. The palace was originally the mansion of a merchant; it is extensive, but has nothing particularly magnificent in its appearance to indicate its being the royal residence of the illustrious house of Braganza.

At the bottom of this square is a very good fountain, which is supplied with water from the adjacent mountains, and conveyed some distance by the means of an aqueduct.

The water is not good, and, on first using it, causes a swelling, accompanied with pain in the abdomen. Ships may be supplied with considerable expedition.

It is almost impossible, for a person possessing the least reflection, to pass this spot without being struck with the contrast which must necessarily present itself to him. On the one hand, he may contemplate the palace of a voluptuous prince, surrounded by courtiers, and wallowing in luxury; on the other, slavery, in its most refined and horrible state.

Leaving the square you enter a street of considerable length and width, in which the custom-house, the residence of the British consul, &c., &c., are situated.

The houses are generally well built; some of the streets are good, and all exceedingly filthy. The shops are well supplied with British, as well as other wares; and whether the vendor be English or Portuguese, he is equally unconscionable in his demand. Most of the streets are designated by the trades which occupy them; as, in Shoe-street, you will find shoemakers; in Tin-street, tinmen; in Gold-street, goldsmiths, lapidaries, &c. Gold-street is the chief attraction, and is generally the resort of strangers, who are anxious to supply themselves with jewellery or precious stones, natural to the country; but it is not always they are fortunate enough to succeed in getting them real, for since it has become the royal residence, it has drawn such a host of English, Irish, and Scotch adventurers, and the Portuguese being such apt scholars in knavery, that, among them, it is ten to one you are offered a piece of paste for a diamond; among the former it is but seldom

otherwise. The inns, although better than in many places, can boast of no excellence.

This city possesses a considerable number of churches, but they are by no means splendid; and, excepting in the chapel-royal, which is adjoining the palace, I observed nothing worthy of notice. Here may be seen a few good paintings of the apostles. The altar-piece is modern, and contains the full length figure of the prince and family kneeling before the holy virgin.

The theatre and opera are attached also to the palace, but possess no particular elegance. The market is well supplied with every article, and is in so eligible a situation, that with a comparatively small portion of trouble, it might be kept in fine order: but the people are idolaters to filthiness, and not less slaves to it than superstition.

The laws of this place seem to be very deficient; without money it is impossible to obtain justice, and with it you can prevent its being administered. The murder of a lay-subject is scarcely ever punished; the least insult to the church, most rigorously.

The trade with this port is very considerable, and from various countries. There is a Chinese warehouse, of great extent, and, at certain periods, articles from China may be procured at a low rate. This establishment is propagating with the greatest assiduity the tea-plant, and from the progress they have already made, I am authorised in drawing a conclusion of its ultimately being of so great importance to Europe, that instead of China the Brazils will be the grand mart for this dearly beloved article.

The country, for a considerable distance round, is peculiarly beautiful—the mountains high and woody—the valleys perfect gardens. Fruits of the most delicious nature are found here in great abundance, and the orange appears to be a never-failing tree; the quantity of this fruit I have seen exhibited for sale in the orange-market is astonishing, and on the same tree is often to be seen the blossoms, the fruit in its primitive state, some half ripe, and others fit for use. The pine-apple is also here, and in great perfection. In the neighbourhood there are several botanical gardens, chiefly belonging to private individuals. Many plants, but rarely to be met with in England, were brought from them in the Briton.

The naval department of the Portuguese is not great, but they had commissioned several sail of the line, and, before we left the port, five of them, with some frigates and corvettes, were ready for sea. Many others, of various classes, were moored off the arsenal, which is of some extent, and situated near the Island of Cobras.

The harbour of Rio de Janeiro is spacious, and, were the heat less oppressive, it might be esteemed as one of the most desirable in the world. There is a breeze from the sea, generally about noon, which cools the atmosphere, and renders it, in some degree, bearable.

Notwithstanding the entrance is so narrow, the harbour increases to the width of three or four leagues, in which gulf, or basin, are numerous small islands, some of them possessing villages, others gentlemen's seats only. The water soon becomes shallow, so that, at a small distance above the island, containing the British hospital, it is not sufficiently deep for a vessel of any burden to pass; but great trade is carried on by means of large boats. The whole of those islands are very picturesque."

MARAMBAYA ISLAND.—This island lies to the westward of the entrance of Rio de Janeiro, about 27 miles, it is 20 miles in length, and forms the Gulf of Marambaya, in which are 3 and 4 fathoms. This gulf is bounded on one side by the main land, and on the other by the Restinga, or island; the latter is a narrow bank of sand, about 20 feet above the level of the sea; toward

the sea it is steep, and the surf breaks against it with violence; toward the bay it is level and smooth. At the western end of this sandy bank is a single bold mountain, about 700 feet high. It has a church and some good springs.

Off the east end of the Praya de Marambaya is Point Guaratiba, at which commences the range of mountains that surround the Gulf of Rio Janeiro; from this point, in clear weather, at $7\frac{1}{2}$ leagues to the east, may be clearly seen the Isle Redonda off the entrance, and the steep shores, in streaks of white and dark green, which terminate the coast. You may equally see, at about 6 leagues to the E.N.E., the Gabia Mountain, which, from its remarkable form, cannot be mistaken for any other, and which is the surest indication of Rio Janeiro, on approaching from the southward. On proceeding thence, toward Rio, no particular caution is required, and having come up nearly to Redonda, you may shape a course according to the wind, between it and the neighbouring islets, recollecting only, before entering, that it is requisite to have a wind which will carry you in before night; such wind commences about noon, the time of day when the breeze sets in from the offing, almost always with sufficient force.

As the land of Marambaya is low, it should, in thick weather, be approached with caution. It is the more necessary as a large or flat rock, surrounded by shoal ground, lies at 3 miles from the shore, nearly off the middle of the isle, which should not, therefore, be approached nearer than to 4 miles, or in 22 to 30 fathoms of water, bottom of sand and gravel.

THE ILHA GRANDE is about 5 leagues in length, and separates the entrances of the harbours of Marambaya and Gairosu. The eastern end of the Ilha Grande lies at the distance of $15\frac{1}{2}$ leagues from Point Gabia, and opposite to the bluff point of Marambaya Island; the channel between it and the latter is very safe for ships of any size, which may take shelter here; the soundings are from 15 to 9 and 7 fathoms. On the eastern side of the Ilha Grande is anchorage, in the several little bays named Palmer, Allroo, and Eschella, for ships of any burthen.

Within the Restinga, or Isle of Marambaya, the soundings, eastward, diminish from 8 to 3 and 2 fathoms. From the Punta do Sena, or N.W. extremity of the isle, a reef, or tongue of sand, extends nearly 3 miles N.N.W., toward an islet, named the Gavia Grande, which lies at the entrance of an opening near the north shore. The best passage, toward the eastern part of the gulf, is made by keeping the main land on board, leaving the Jaguano groups on the starboard side, and the islands Sacurucu and Madiura on the port. There is anchorage at $1\frac{1}{2}$ mile, S.E. $\frac{1}{2}$ S, from the River Taguai, in 5 or 6 fathoms, muddy ground, with the Island Madeira, W.N.W. $\frac{1}{2}$ W., $2\frac{1}{2}$ miles; Tacurucu, W.S.W. $\frac{1}{2}$ W.; and Mount Marambaya, S.W.; on sailing out from this spot keep the main land on board, and pass between Tacurucu and Fatada, or the N.E. isle of the Saguana group. You may freely stand toward the Gavia Grande, but must be cautious in approaching the Bank of Marambaya, proceeding in not less than 10 fathoms, as the edge of that bank is very steep.

At about 2 miles from the south side of Ilha Grande is Georgi Grego islet, which is bold-to. It affords not only anchorage, on its north side for large ships, but plenty of wood and water.

GAIROSU BAY.—Between Ilha Grande and Punta Joatinga is the entrance to Gairosu Bay. It may readily be known by Friar's Hood, a remarkable inland hill to the northward; bring this hill to bear N. by E. $\frac{1}{2}$ E., and steer toward it, until you are $2\frac{1}{2}$ miles within the point of the island, when you may anchor. By keeping within this distance from the island, on the

east, a sunken rock will be avoided, which lies nearly in the middle of the entrance. On coming in numerous isles, inclosed within the bay, will be seen; and between those on the east is a passage into the Gulf of Marambaya. The village of Villa Grande is on the N.E. shore. The points of Joatinga and Caiocu terminate the south part of the high lands which encompass the great bay of Ilha Grande, &c.; they are high and steep, and may be approached with safety.

S.W. by W. $\frac{1}{4}$ W. from Point Caiocu, distant 25 miles, is the Porcus, or Hogs' Isles. Between the larger isle and the coast is a fine channel, into which large vessels may enter and pass with perfect safety; but they should not venture in with a shifting wind. One of the best roadsteads hereabout is in a cove of Porcus, with 8 or 9 fathoms of water, sheltered from all winds, excepting those from N.E. to E. by N., which seldom continue so long as to cause a heavy sea: here the tide is scarcely perceptible. Opposite to the Ilha de Porcus is the Bahia de Tabaroes, or Shark's Bay, capable of accommodating large ships, the anchorage being clear and good; its entrance is about a mile wide, with 8 fathoms water in it.

The Busios Islets lie S. by E. from Ilha de Porcus, distant 11 miles, and, at 6 miles W. 31° S. is the Isle Vittoria. Between these several groupings the passage is clear for vessels of all dimensions, and so is all the basin formed between the island of St. Sebastao and the continent, with the exception, that the channel between St. Sebastao and Vittoria is contracted by a reef, extending 2 miles S.S.W. from the latter, and therefore vessels of large draught should not attempt it.

ST. SEBASTAO, OR ST. SEBASTIAN.—This island is $18\frac{1}{4}$ miles in length, and in clear weather may be seen at the distance of 45 miles. The western coast opposite to the continent forms, with the latter, the gullet or strait, and several deep bays, wherein there are excellent anchorages, bottom of oaze or mud, and depths of 7 to 22 fathoms; vessels should enter it from the northward, and keep near the island. Its general direction, half-way down, is S.S.W. $\frac{1}{4}$ W., and thence more westerly. It is contracted by a bank extending from the continental coast on the west, for more than two-thirds of its length from N. to S. In the roadsteads, on the island side, the depths are from 15 to 18, and the depths in the channel vary from 10 to 20 fathoms; the bottom muddy ground. The greatest breadth of the strait is, at the north part, 3 miles; but two-thirds of this space is occupied by the bank on the west, over which are from 5 feet to 3 fathoms.

The ancient town of St. Sebastian is on the continent, at the narrowest part of the strait. Since 1817 the Brazillians have founded a new town on the Isle, named Villa de Princeza. S.W. of this town, at the distance of 400 fathoms, is the best anchorage for ships of war, where there are 16 fathoms of water, bottom of grey sand.

The south entrance of the gullet is not above a mile wide, but during a S.E. gale it will afford shelter to ships of war. There appears to be little or no regular set or rise and fall of tide here; but the current with northerly winds set to the southward, and with southerly winds to the northward; there may however be a rise of 2 or 3 feet on the days of full and change, on which the time of high water has been estimated at 11h.

Point Pirasonango, the S.E. point of the island, is situate in latitude $20^{\circ} 57' 32''$ S., and longitude about $45^{\circ} 11' 40''$ W.

At about $15\frac{1}{4}$ leagues W. by S. from the S.W. end of St. Sebastian, is Moela Island, situated near the entrance to Port Santos.* In the bay be-

* On this island there is said to be a fixed light, visible about 12 miles.

tween, at 5 miles from shore, lies the Montao de Trigo, or the Corn Stack Islet, in latitude $23^{\circ} 51' 4''$ S., longitude $45^{\circ} 43' 10''$ W. The Alcatrasses, or Cormorant Isles, lie S.S.E. from Montao de Trigo, distant 16 miles; the largest of this group may be seen at the distance of 21 miles. It appears from the E.S.E. in the form of a dolphin, connected with two small rocks, which turn to W.S.W.; another rock, larger than the two just mentioned, lies at 2 miles to the W.N.W., and two or three others lie nearly at the same distance to the N.E.; the pilots say that the bottom, near these rocks, is not clear, and that it is dangerous to approach them within 4 or 5 miles, unless the wind be fair, as the currents from the gullet and eastern side of St. Sebastian, occasionally affect the sea hereabout, this precaution is the more requisite. From the north-easternmost of these islets the entrance of the Port of Santos bears nearly West, distant 39 miles.

SANTOS.—This harbour is formed, on the east, by St. Amaro Island, which is separated from the continent by the River Batioga; through this, river craft may still pass into the harbour. The southern, or chief entrance, to the Port of Santos admits large vessels, which may enter and be sheltered from all winds, excepting those from S.S.W. to S.E. On advancing into the bay, from the southward, you will have 10, 9, 8, and 7 fathoms of water, until near the bar, upon which there are only $4\frac{1}{2}$ and 5 fathoms; the passage within is narrow, but the eastern side is the boldest, having deep water close to the shore. At 6 miles up the river, on the eastern, and above the second bar, is a fort, upon a perpendicular rock, near which is a depth of 18 fathoms. Having arrived here you will see the town of Santos to the west, on steering toward which, at 2 or 3 cables' length from shore, you will avoid the bank stretching from the north side; and when nearly up to the town you may anchor; the best spot is abreast of the town, in 7 fathoms, muddy bottom.

The Lage or Rock of Santos, otherwise named Bird Isle, is about 6 feet high above the sea: it lies $16\frac{1}{2}$ miles S. 20° E. from Moela Islet; and between it and Santos are 15 to 18 fathoms, sand and mud.

To the S.W. of the Port of Santos is the village of Conceicao, distant 27 miles; and at 7 miles E. 25° S from Conceicao is the Lage or Rock of Conceicao, about 12 feet high above the sea; at a little distance from it are 12 fathoms of water, bottom of soft sand. From this place the Port of Santos may be distinctly seen at 7 leagues to the N.E.

Redonda, or Little Queimada, is a small round islet, thickly wooded, and visible 20 miles off: it lies at the distance of 10 miles S. 30° W. from the Lage of Conceicao, in latitude $24^{\circ} 21' 26''$ S., longitude $46^{\circ} 46'$ W.

The Queimada Grande is a large rock, nearly barren, lying at about 10 miles to the S.E. of Redonda, in latitude $24^{\circ} 28' 21''$ S., longitude $46^{\circ} 38''$ W. This islet is long and narrow, extending about N.N.E. and S.S.W., nearly 2 miles, with a reef from its northern point. Its highest part, appearing of a round form, is to the S.W.

A rock, stated to lie in latitude $25^{\circ} 41' 20''$ S., and about $44^{\circ} 50'$ W., was discovered on the 13th of February, 1811, by Medeiros, a pilot of Bahia, who was about a year along with Baron Roussin, and in whom Baron Roussin considered all confidence might safely be placed. If it exists, it lies about S. by E. (*true*) 35 leagues from the S.E. end of St. Sebastian.

From Conceicao the coast trends to the S.W., 14 miles, to the creek of Piruibe; thence follow, in succession, the islets and point of Guaraha, the little River Una, Point Jurea, the River Iguape, the entrance of the Mar *Pequeno de Iguape*, and the Port of Cananea. The soundings along shore *generally increase in depth according to the height of the lands*; and there

may be found, at from 3 to 10 miles off shore, 7 to 18 fathoms of water. You may anchor off any part of the shore, at 2 or 3 miles from the beach, on an excellent bottom, in from 5 to 9 fathoms; but as there are no harbours for large vessels, there can be no motive for anchoring here, unless in a calm, when not exposed to danger.

CANANEA.—Bom Abrigo Islet marks the entrance of this port; it is high, covered with trees, and vessels may anchor at a little distance from it to the eastward; a smaller islet lies on the south side of it, 2 miles to the eastward of which are 10 and 11 fathoms of water, over a bottom of sand. The common channel into the harbour is to the northward of Bom Abrigo, although obstructed by several shoals; but the southern channel is the deepest, and a vessel may venture into either with the assistance of a pilot. The bar may be found by means of Morro Cardoz, situate inland about 5 leagues to the W.N.W., and by the Praya or beach of Iguape. On proceeding southward from Bom Abrigo, you will see, at the distance of 10 miles, Castillo Islet, which is 32 feet high above the water, and nearly 9 miles beyond this, in the same direction, is Figueira Islet, 160 feet high; both are nearly barren, and bear from each other S. 28° W., and N. 28° E. (by compass); at a mile distant from each are 13 to 9 fathoms, fine sandy ground.

PARANAGUA.—The entrance to this gulf, or bay, is sheltered and divided into two passages by the Isle do Mel, or Honey Isle, which is low, and has several hummocks on it, resembling islets at a distance. To the northward of Isle do Mel are the Palmas Islets. The southern passage being obstructed by breakers, is not navigable; the northern admits brigs. In entering this latter passage, you leave the Palmas Islets on the starboard side; but here a pilot is indispensable. The town of Paranagua is on the south side of the gulf, within the west end of Colinga Isle, distant $4\frac{1}{2}$ leagues from the entrance.

RIVER GUARATUBA.—To the S.S.W. of the Isle do Mel, distant 23 miles, is the River Guaratuba: its bar lies at the southern extremity of a shallow bank, which extends from the shore eastward, to the distance of 3 to 8 miles. On the edge of this bank, in latitude $25^{\circ} 47'$ S. is the Ilha do Coral, 64 feet high, and more to the southward are two islets, named the Itacolomis, 21 feet in height, lying in latitude $25^{\circ} 50' 20''$ S., and longitude $48^{\circ} 24'$ W.; these may be approached from the offing to 1 or 2 miles, where there may be found 9 to 11 fathoms of water, bottom of sand and mud.

From the River Guaratuba, distant $5\frac{1}{2}$ leagues, is the Point of Joao Dias, the northern point of the Island of San Francisco, and which forms the eastern extremity of the river of that name; at $2\frac{1}{2}$ miles to the east of the point, are the Islets of Garcia, and south from the latter is another group, named the Tamborettes, distant 2 miles from the nearest shore. Five miles to the S.S.W. of the latter are the Remedios Islets and the Lobos Tapilingo, situate off the mouth of the Aracasy, or southern branch of the Rio San Francisco; all these islets are covered with trees, and small vessels pass between them and the shore.

The River of San Francisco is the only considerable and important river hereabout; it is broad, but not deep, and falls into the sea in a N.N.E. direction. The bay before its mouth affords anchorage in several depths, and at two leagues off there are 9 fathoms of water, over a bottom of fine sand.

Between Rio San Francisco and Point Itapacoroya is a slender bay, broken only by the small river of Itapucu; in the southern part of this bay

are the Itacolomi Rocks, 16 feet above water, and the Faya, of 32 feet. Near the islets you may anchor, and obtain fresh water, sheltered from winds between the south and west. Between the Point Itapacoroya and the island of Santa Catharine are several bays; in the last, named Tijoucas Bay, which is to the N.W. of St. Catherine, there is good anchorage.

On approaching St. Catharine's, from the northward, several small isles and islets will be seen; the largest is that named Arvoredo, in latitude $27^{\circ} 16' 47''$ S., longitude $48^{\circ} 20'$ W. The channels between are perfectly safe, the depths varying from 22 to 11 fathoms, bottom of oaze and grey sand; taking care only to avoid the rock and breaker of San Pedro, which is situate at about 3000 fathoms W.N.W. from Arvoredo. You may range along the points of land to the north-westward of these isles, named Zamba, Bombas, Garopas, and Camboriu, at the distance of 2 or 3 miles.

ISLAND OF ST. CATHARINE.—This island, which forms an excellent harbour, is 9 leagues in length, and its greatest breadth is 10 miles; the northern point is in latitude $27^{\circ} 22'$ S., and longitude $48^{\circ} 22' 30''$ W. The entrance to the harbour is to the northward of the island, where lie several small islands; those of Alvaredo and Gal cannot easily be mistaken, particularly the latter, remarkable by the long white streaks on its steep sides, and by St. Peter's Islands, which are at the south end, and two rocks at its northern extremity. The passages in are extremely good and easy; vessels coming from the northward are recommended to steer in between the islands Gal and Alvaredo, leaving the small rocks and islands of San Pedro on the star-board side. The anchorage is perfectly safe everywhere, whether to the northward or southward of the Fort Santa Cruz, which stands at the entrance; yet it is better to anchor to the southward, as well on account of communication with the town, as of the vicinity to the village of S. Miguel, where the best water is to be procured. In coming to St. Catharine's, from the southward, you steer between the Island of Arvoredo and that of St. Catharine; the passage is perfectly safe. If the wind should be contrary, a ship may work in without danger, for close to St. Catharine's there are 4 fathoms of water, and the coast towards Arvoredo is equally deep.

The ebb and flood here are very unsettled, and depend entirely on the wind, the flood sets in from the north, the ebb from the south; and, as the wind is almost always from the sea, the ebb, with a fresh northerly wind, is scarcely apparent, and seldom lasts more than two or three hours.

BARON ROUSSIN says that "The Island of St. Catharine is sufficiently elevated to be seen, in clear weather, at the distance of 15 leagues. At this distance is found 62 fathoms of water, and this depth diminishes to four cables from the coast, where there are only 4 fathoms.

On approaching from the eastward the island appears in very irregular heights, being intersected by mountains separated by deep valleys; the greatest elevation is from north to south, and the mountains of the continent beyond it are a little more elevated than that of the island. You will particularly distinguish among them the Morro de Camborella, a branch of the eastern Cordilheiras, extending from St. Catharine's to Rio Janeiro.

About the middle of the isle, near the sea, is a large lagoon, under the high lands, which presents an apparent opening, that may serve as a land-fall. When, at 3 leagues from the eastern coast, you bring this opening to the west, the N.E. point of the isle will bear about N.W., at 3 leagues. All the exterior coast is clean and moderately steep, and you may range along it without danger, passing several large rocks which lie off it.

The island may be navigated all round, and it presents numerous anchorages between its western coast and the continent; but the north part of the

intervening channel is the part most fit for vessels drawing much water, and it is, therefore, that generally used. This passage is rather less than 2 leagues broad, clear of danger, and, on coming in, you may advance to either side, only observing to keep clear of the Northern Moleques, large rocks which lie to the S.E. of Point Rapa, the north point of the island. This channel hence is clear, and you may beat up to either shore without risk, in from 40 to 28 feet of water.

Having advanced within the strait, you may anchor in any part, according to the vessel's draught; and, in keeping near mid-channel, the depth will be sufficient for large ships when at 1000 toises (1065 fathoms) S. by E. from the little isle Anhatomirim, on which the Fort of Santa Cruz is built. Passing this point on advancing to the south-westward, the depth gradually decreases to 15 and 12 feet; and to the southward of the Raton Islets, lying on the eastern side, there is not more than 10 or 12 feet of water. In the large bay to the west, named the Sacco Grande, the depths are still less; this bay is a tranquil place, frequented mostly by vessels employed in the whale fishery of the coast, and is well adapted for small vessels.

The tides are regular in the gullet, but it has been remarked, that, as they enter by the north and south at the same time, meeting in the roadstead near the town, they return in a similar way, with greater or less velocity as they may be accelerated or retarded by the prevailing wind. The mean velocity of the current rarely exceeds three-tenths of a mile in the hour, at half-tide, and the difference of level, in ordinary tides, is not more than three feet. In the Syrgies, however, the current frequently runs at the rate of a mile and a half, and then the water rises and falls 5 and 6 feet. Time of high water, on the full and change, 2h. 40m.

The governor of the province resides in the town of Nossa Senhora do Desterro, which is situate at about 10 miles S. by E. from the islet Anhatomirim, on the narrow of the strait, about half-way down the island. This place, which is well sheltered, may be reached at all times by small vessels, and the communications between all the points are quickly made. At the anchorage, half a mile before the town, the depth, at low water, is 20 feet.

The approach to St. Catharine's may be made indifferently on the parallels between $27^{\circ} 30'$ and 28° . The winds and currents in the offing are not such as to cause much error in the route; but, at all times, you should prefer making the southern part of the isle in the southern monsoon, and that of the north on the contrary."

The coast to the southward, and the southern part of St. Catharine's, were not surveyed by Baron Roussin, and, in consequence, M. Barral, commander of the surveying vessel l'Emulation, was charged with continuing the work, and surveying the Rio Plata; the following is his description:—"The lands of the island, and of the adjacent coast to Cape Santa Maria Grande, are very high and woody. The highest mountains which are seen beyond the island are in the chain of *Cubatao*; they are covered with clouds during the prevalence of southerly winds, but are clear with the winds from the N.E. In the offing, at 12 leagues from the island, there are soundings of 62 to 72 fathoms, with a muddy bottom. On approaching, the depth gradually decreases; at a distance of 3 leagues are 33 to 35 fathoms, and 18 to 28 at 4 miles.

The Isle Arvoredo, at the northern entrance, which is high, has two sugar-loaf summits, which are first seen on approaching. The Islet Badejo, 8 miles to the southward of Arvoredo, is destitute of vegetation.

A vessel drawing not more than 14 feet of water, and entering by the north

passage for the town of N. S. do Desterro, having passed the north end of the island, should be guided by the following indications:—Steer for the Cape Quebra Cabaco, on the continent, leaving the two islets, Ratons, on the port side, at $1\frac{1}{2}$ mile or less. The course toward the Island of Anhatomirim will be about S.W. by W., and thence S.W. by S. When you bring the Little or Southern Raton to bear E. $\frac{1}{4}$ N. (East) at 2 miles off, change the course to S.E., and continue it thus for 3 miles, passing a rocky flat, Impatitinga do Norte, off Cape Quebra Cabaco, on the starboard side; on these rocks are only 4 or 5 feet at low water. When you have brought the cape to the south of these rocks, bearing W.N.W., the route is to the S.W. until you bring the rocks N.N.W. $\frac{1}{4}$ W.

You then steer to the south-westward, about half a league, so as to pass at 4 or 5 cables to the eastward of a rock near Cape Henriques, which, being a woody cape, is thus distinguished from Quebra Cabaco; next proceed south-eastward, toward the narrow part of the strait, leaving the Islet and Point do Lial, on the western side, at the distance of 3 or 4 cables. Steering hence S. by E. you enter the Little Strait or Narrows, which is commanded on the left by Fort Santa Anna, and on the right by the Battery of San Joao. Here you will find from 11 to 16 fathoms of water, and will perceive, in advancing, the Islets Gato and Das Vinhas, at the extremities of the cove on which the town is built; you leave the first on the left, and may then cast anchor in 20 to 21 feet of water, with the Islet Gato bearing N.N.E.; Das Vinhas, S.S.E.; and the steeples of the cathedral, N.E. The city of N. S. do Desterro is situate in latitude $27^{\circ} 35' 25''$ S., longitude $48^{\circ} 29' 16''$ W.

On coming from the northward to the town, at times, there are found spots of only 7 feet of water, but the oaze has 5 feet at least, and the vessel will not be injured; with high water the *Emulation*, which drew 14 feet, came up to the town in three days. When the water was low and the stream weak she anchored.

The *Eastern Coast of St. Catharine's* is clean, but off the points, at some distance, are several rocks and islets above water: these are the Northern Moleques, the Islet Badejo, the two Aranhas, the Isle Xavier, Ilha do Campexe, the Southern Moleques, the Tres Irmaos, or Three Brothers, the Papagaios Isles, the Fort Isle, at the entrance of the southern passage, and the Isle dos Cardos, within the same.

In proceeding along the coast, at the distance of 3 or 4 miles, we passed between the Irmaos and the southern Moleques, in 15 fathoms of water. The only obstructions are the islets and rocks above-mentioned, which may be seen 9 miles off, and about which are 13 fathoms. At the Isle do Campexe you may find anchorage, sheltered from southerly winds.

The *Southern Entrance* into the Strait or Gullet of St. Catharine's lies between the S.W. extremity of the island, Point dos Naufragados, and the Fort Isle, a very narrow passage, but in which there are 17 fathoms of water. In entering from the southward you should have a leading wind, rising tide, and fair weather, without which the current may carry you on the Fort Isle, or on the opposite point, which are less than 300 fathoms apart. The vessel should not draw more than 15 feet. On coming from the southward you steer toward the Fort Isle, and, when you have the Papagaios on your left, you will see the Irmaos to the right. On passing hence, north-westward, the pass between the Fort Isle and Point Naupagados will be open; having passed through, on a West course, you change the course to North, and pass the Islet Cardos, which is remarkable for an insulated tree, which stands on its summit.

You pass to the eastward of Cardos, at the distance of one or two cables, and then proceed north-westward, toward the Enceado do Brito, to the distance of half a mile; and thence north, along the western shore, to the point of Pesqueiro Fordo, at the distance of 4 cables; thus you will leave, on the western side, the village of Enceado do Brito, and farther on a cluster of houses and cottages, forming the little hamlet of Cedros. On your right, at a distance, you may see the village of Ribeirao, or San Lapa, on the Island of St. Catharine, and nearly before you will be an islet, the Ilha do Largo; before arriving at the last you will have passed a flat of dangerous rocks, beyond which you will be, when the steeples of the cathedral appear on the western part of the Islet Largo, and the west point of Cardos is on the fort of the south bar. From off the Isle do Largo continue your course N. $\frac{1}{4}$ W., until an islet, des Cascas, bears West, thence proceed toward the steeples of the city, up to the anchorage, between the Islets do Gato and dos Vinhas.

The Coast Southward.—At the distance of $2\frac{1}{4}$ miles from the south end of St. Catharine's is Point Pinheira, under which is good anchorage, sheltered from southerly winds; from the outer extremity of this point, distant $2\frac{1}{4}$ miles, is the Ilha do Coral Islet, about three-quarters of a mile in length; it is covered with trees, and is a useful mark for vessels bound in by the southern passage. Its situation is latitude $27^{\circ} 55' 10''$ S., longitude $48^{\circ} 29' 10''$ W. Between this islet and the cape St. Marta Grande are the Ilha das Araras, to the S.E. of Point Bitula, in latitude $28^{\circ} 18' 0''$ S., longitude $48^{\circ} 31' 32''$ W.; the Islet Tocaromi, a high and steep rock, to the S.E. of the Ilha Araras, in latitude $28^{\circ} 19' 29''$ S., longitude $48^{\circ} 30' 30''$ W.; and the Isle dos Lobos de la Jaguna, to the S.E. of the Araras and Tocaromi, in latitude $28^{\circ} 24' 36''$ S., longitude $48^{\circ} 40'$ W.

At Point Bitula begins the beach, within which is a lake, and the towns of Villa Nova, Santa Anna, and la Laguna; the last is situate at the south part of the lake, at a mile to the N.W. of the bar, in latitude $28^{\circ} 28' 33''$ S., and longitude $48^{\circ} 45' 24''$ W. At La Laguna is anchorage, practicable only for small vessels drawing under 7 or 8 feet of water, as there is a bar at the entrance.

The Cape Santa Marta Grande is the final termination of the line of mountains extending within shore to the northward, and is remarkable by having on its summit several great white rocks, which, from a distance, appear like an assemblage of houses. The variation of the compass here, in November, 1831, was $7^{\circ} 20'$ E.

Between Cape Santa Marta Grande and the bar of the Rio Grande de San Pedro, an extent of about 95 leagues, the coast is extremely low, and variegated only by sand-hills and stunted bushes. It can hardly be seen, in clear weather, from the mast-head, at the distance of 7 or 8 miles, and from the deck at not more than 3 miles; the first part, from the north, trends nearly S.W.; this part is named the Praya, or Beach of Torres, it begins in longitude $48^{\circ} 44' 56''$, and ends in $49^{\circ} 55' 52''$ W. The second part trends N. by E. and S. by W., and is named the Praya, or Beach of Fernambuco. Its eastern part begins with the termination of the former, in latitude $29^{\circ} 52'$ S., and it extends to longitude $50^{\circ} 34' 52''$ W. The third part trends nearly S.W., and is known under the name of the Praya do Destreito, from latitude $31^{\circ} 12'$ S. to the mouth of the Rio Grande de San Pedro.

When to the southward of Cape Santa Marta Grande, you may see, in running along, a chain of mountains extending westward, about 15 leagues from the sea into the interior country, and disappearing at Torres, which stands at 25 leagues from the cape, in latitude $29^{\circ} 28'$ S. The beach here

may be approached to the distance of 3 or 4 miles, and was coasted, at this distance, by the *Emulation*; but there were no marks on shore fit for triangulation; the situation of the vessel was ascertained by frequent observation, and estimated distance from shore. Twenty-seven fathoms of water, bottom of sand, mud, and shells, were found at 4 miles to the south of Cape Santa Marta Grande; and beyond that, in going to Torres, the water diminished to $4\frac{1}{2}$ fathoms, near the shore. We may judge of the decrease of bottom, in remarking that, from the 27 fathoms to the $4\frac{1}{2}$, there is a distance of 25 leagues.

The Praya do Fernambuco, between the parallels of 30 and 31 degrees, is more steep than that of Torres. The *Emulation* found 35 fathoms of water, bottom of mud and sand, at 4 or 5 miles from the shore. On sailing out in the offing, to the distance of 15 leagues, the depths of water increase progressively to 85 fathoms, soft sand: passing this limit there was no bottom at 100 brasses, or 91 fathoms. At 10 leagues out the depth is about 74 fathoms.

The Praya do Destreito terminates at the Rio Grande de San Pedro, as above-mentioned; from 9 to 13 fathoms were found in coasting along it, at 3 or 4 miles; at this distance the *Emulation* ran 17 leagues, over a bottom of sand. The shore is not higher than that of Fernambuco, but there are some sand-hills more elevated, and there is more vegetation. In the offing, at 20 or 24 leagues S.E. from this beach, are 34 and 35 fathoms of water, bottom of mud and sand; and, on approaching the land, the depths gradually diminish."

REID'S SHOAL.—Mr. Reid, of the brig *Sweet Home*, of Aberdeen, states in a letter, dated Rio Grande, March 14th, 1842,—“The vessel, on her voyage from Liverpool to that port, struck on a shoal, in latitude $31^{\circ} 3' S.$, and longitude $49^{\circ} 47' W.$, at least 70 miles off the Brazilian coast; luckily there was no sea on, and the wind was N.E. by E., which enabled her to clear the shoal immediately, making but little water. After his arrival at Rio Grande, the master of the *Sweet Home* ascertained that a Brazilian schooner had grounded on the same reef a short time before. The reef, or shoal, alluded to, has not been laid down in any chart, and lies immediately in the track of vessels bound to that port.”—*Shipping Gazette*, July 1st, 1842.

The RIO GRANDE, or entrance to the Great Lake of St. Pedro, lies in latitude $32^{\circ} 7' 20'' S.$; but vessels having a N.E., E.N.E., or Easterly wind (any other wind may be dangerous that is from the sea) should make the land in latitude $31^{\circ} 30' S.$; you may stand with security for the land, steering W.S.W., until you find yourself in soundings, and when you find yourself in 13 fathoms, you will see the land, if to the northward of the bar; but, if you have passed it, you will not, as the bank to the southward stretches out to a greater distance; and you cannot see the land, unless when you are in 8 fathoms, and then barely.

The land, about $31^{\circ} 40'$, you will know by seeing several tufts of trees, pretty high and rounding to the northward; and, standing along shore, steering S.W., you will see sundry straggling tufts, but not so high. Here, if it be very clear weather, you may see houses, which will appear in the opening of the trees; you may then stand along shore with safety, keeping in from 10 to 9 or 8 fathoms. Losing sight of the trees and houses you will see some mountains of sand, and an entire sandy beach; and, when you are within 2 leagues of the bar, you will see tufts of trees, and find the soundings decrease, with a bottom of mud and red shells. You must now keep in 8 fathoms, but not less, as the water sets right on shore when close to the beach. The lead must now be kept going until you find soft mud, when you will find your-

self close to the bar; you must then haul up and steer about South, to keep clear of the bank. You may easily know the bank by the sea breaking over it, particularly from the eastward.*

DIRECTIONS FOR ENTERING THE PORT OF RIO GRANDE, by Captain James Harrison, of the Brig General Wolfe. *Nautical Magazine*, October, 1836.—“No vessel drawing more than 10½ or 11 feet, should attempt to enter the Port of Rio Grande de San Pedro, and she must have a leading wind to cross the bar.

The land ought to be made to the north-east of the bar, in about latitude 32° S.; there is no difficulty in doing this, as the soundings are perfectly regular, about 60 fathoms at 60 miles distance, and shoaling very gradually; when in 10 or 11 fathoms you will see the land. It is not advisable to get in shore to the southward of the bar.

The coast is little known, and I never could get any of the coasters, or pilots, to give me any information about the shoals said to exist thereabouts. In general, but not always, the bottom is mud to the southward and abreast of the bar, whilst it is usually sandy to the northward; and, if to the southward of the port, the land will not be seen till you are in 7 or 8 fathoms. I do not know of any mark to tell how far you are from the port, as the whole shore consists of low sand-hills, interspersed with bushes, and these hills alter their shapes with every gale of wind. The town of the Estreito lies about 30 miles N.E. of the bar, but you must be close in shore to see it; this is the only object which breaks the sameness in the appearance of the coast for many miles. The latitude is the best guide.

After making the land, run down at a convenient distance, till you see a square white tower, which stands at the entrance of the harbour, in latitude 32° 9' S.; this is a very conspicuous object, makes like a sail at a distance, and may be seen some time before the land about it. On the top of this tower a man is stationed, who, as soon as he perceives a vessel, hoists a red flag,† when the pilot boat goes out to sound the bar; as soon as you see the tower distinctly, hoist the signals corresponding to your draft of water at the fore. When you get down to within 3 or 4 miles of the tower haul in shore, into 4½ fathoms, if a commanding breeze; or you may bring the tower to bear W. by S. ½ S., and steer for it, when you will soon see the boat at anchor on the bar, with the signal, corresponding to the depth of water on the bar, flying at the mast-head.

North-east Bar.—“Should there not be sufficient water for you, the red flag on the tower will now be hauled down, when you must haul out to sea, and cruize off and on till the water rises. Sometimes a vessel gets down near the bar before the boat gets out; in this case the red flag will be hauled down, and you must keep off and on till she arrives at her station; you will probably see her beating out, but do not attempt to run for her until the red

* The following appeared in the *Nautical Magazine* for 1843, page 131; its date is Rio Grande de San Pedro do Sul, June 20th, 1842, signed J. Houghton:—“A vessel arriving here should not draw more than 10½ feet water, in consequence of the shoalness of the bar, particularly when the winds have prevailed for some time from the West or N.W. Make the land about the Estreito, 8 leagues to the northward, where the anchorage ground is good, and where a vessel may come to with safety with any other than a south-easterly wind; provided there is no possibility of getting in that day, and which I should recommend in preference to standing off and on, at the risk of being drifted away by the current. Early the following day get under-way, coasting it down, not venturing in less than 4½ fathoms water, until you come in sight of a white tower, which is a very conspicuous object; this lately has been made higher; there is a lantern on the summit, which is lighted at night. (See a subsequent page.)

† See the list of signals subsequently given. It is possible that since Mr Harrison wrote these directions the signals he mentions may have been altered.

flag is up again. Do not lie-to, as there is usually a strong lee current. The boat not being out in time seldom happens now, as the pilots are much more attentive than they used to be. So soon as the flag is up again, steer for the boat.

Particular attention must now be paid to a man in this boat, who will wave a small red flag, on the end of a long pole, in the direction you are to steer. Thus, if he wants you to steer more in shore, he will point toward the shore, and keep it pointed in that direction till your course is altered sufficiently, when he will lower it; and *vice versa*, luff-to, or bear away immediately, according to the signals he makes. When you get near the boat he will weigh his anchor, and proceed ahead of you; follow in his wake, still paying attention to his signals, and you will soon pass a second boat at anchor: here the water deepens, but the channel is not a cable's length broad. After passing this boat you haul more up toward the guard schooner, and choose your anchorage anywhere to the westward of and near her. (till you are out of quarantine) in from 4 to 8 fathoms, excellent holding ground; do not go to the eastward of her, as she lies on the edge of the bank. Have an anchor ready the moment you are over the bar, as it frequently falls little wind when you open the river, with a strong current setting over the banks."

The New Southern Bar, for which directions are added, is now the principal entrance into Rio Grande, as will appear by the following communication, addressed to the Editor of the *Nautical Magazine*, by Captain Harrison, the writer of the foregoing remarks, dated Liverpool, April 10th, 1838:—"When I wrote to you in August, 1836, respecting the entrance of Rio Grande de San Pedro, I had no idea that a change in the position of the bar would have taken place so soon as it has done; the principal entrance being now to the southward of the tower, instead of to the N.E. of it. In December, 1836, I entered by the N.E. Bar, (the one for which I sent you directions) but the pilots said then, that the small swatchway to the southward, which usually had about 7 feet on it, was improving; and in March, 1837, I saw a brig go out by it, drawing 9 feet 3 inches,—still there was no change in the N.E. Bar. I arrived there again in October, 1837, and entered by the N.E. Bar, drawing 10 feet 6 inches; the pilots then said that the southern bar was far the best. Soon after I arrived the N.E. Bar closed up, occasionally opening out again, but never with much water on it, so that vessels now enter by the New Southern Bar."

Captain Harrison still farther adds:—"The principal entrance into the Rio Grande is now to the southward of the tower, instead of the N.E. of it; the directions before given for making the tower may be followed with the wind at N.E., which is the prevailing summer wind; but no vessel can enter with that wind, as the course will be N.E. immediately after crossing the shoal part of the south bar. If the wind is southerly, the land had better be made just to windward of the port, and you may probably enter at once. The signals, mentioned in my former letter, are to be hoisted at the fore, and the red flag on the tower will be hauled down if you cannot enter.

On making the tower you will perceive, on the top of it, two perpendicular flag-staffs, (one taller than the other) and two horizontal poles; the tall flag-staff is for the red flag, as a signal for you to steer for the bar. With any signals which may be hoisted on the short flag-staff, you have nothing to do; these are intended to intimate to vessels, *in the harbour*, that they can go to sea. Formerly this short flag-staff could not be seen from the sea, being hid by the light-room, which was on the top of the tower; but the light-room was burnt down in January, 1837, and has not since been rebuilt,—of course there is no longer a light. The two horizontal poles, which project from

windows a few feet below the top of the tower, are for pointing out to a ship at sea which bar she is to steer for; one of these poles points to the S.W., and the other to the N.E. If the ship be steering for the N.E. bar, and the look-out man wishes her to go to the Southern one, a flag will be run out on the S.W. pole, and *vice versa*. Sometimes, if the look-out man sees that a vessel is puzzled to find the bar boat, (which is occasionally not easily seen, on account of the high breakers between here and the ship) he will direct her by means of these flags; steer to the N.E. when the N.E. flag is run out, and to the S.W. when the S.W. is out, paying attention to these in the same as you do to the waving of the flag in the bar boat; as soon as the look-out man perceives that you can see the signals from the bar boat he will desist. Though these horizontal arms are intended for this purpose, and are sometimes used when a vessel gets into danger, a stranger must not rely upon seeing them, as the pilots are very inattentive.

When I wrote to you before there was an opposition party of pilots, which made them all very much on the alert; this did not last many months, and they soon relapsed into their old careless habits. If running down the coast from the N.E., and proceeding for the south bar, do not haul too close in shore when within three or four miles of the tower, but keep in about 6 fathoms, so that you may clear the bank which fronts the entrance of the river. If the wind will allow you to enter, and there be sufficient water, which will be known by the red flag being kept up, you may bring the tower to bear, and steer for it until you see the bar boat. Then pay attention to the waving of the flag from the boat, as mentioned in my former letter; when he weighs follow in his wake. The course will be about N.E. immediately after crossing the shoal part of the bar: leave the second boat on your port side, and, after passing her, your course will be about N.W.; but you cannot go wrong following in the wake of the bar boat, and paying attention to the waving of his flag.

This Southern Bar is, in some respects, better than the other used to be. The channel is considerably broader, and the shoal part much shorter, being not above two cables' length across, and deepening quickly, both outside and inside, to 3, 4, and five fathoms. It is to be observed that the N.E. winds depress the water, and that south-westerns raise it; therefore, you cannot load so deep in the port as formerly, as you cannot get out with a S.W. wind; again, if a S.W. wind blows strong, which it frequently does, at its very commencement, it raises such a sea, on this southern bar, as to render it impassable for a vessel which may be outside,—in fact, the bar boat could not get out. I came over this southern bar in December, 1837, drawing 11 feet 3 inches, with a northerly wind, and the water unusually high for the wind in that direction; the brig thumped over all the shoal part. Fortunately the sea was a-beam, so that she fell bodily on her keel fore and aft; and, as the ground is not hard, she did herself no harm. I do not think any vessel ought to go there drawing more than 10 feet 6 inches, though many do so.

With a S.E. wind I would not advise any one to run for the coast, unless the weather promises to be quite fine. With the wind from the N.E., round to the northward, there is pretty good anchorage, in 5 or 6 fathoms, just outside the southern bar; you will be sheltered by the bank to the N.E., and if the wind come round to the N.W. you may enter, but beware of a southeaster. There is plenty of room for a fore and aft rigged craft, of little water, to beat over the bar, but the current generally runs too strong with the wind. According to the pilots, this Southern Bar is nearly in the same position that it was about 14 years ago; and that it gradually moved to the

N.E. until it got close to the shore, about two miles to the N.E. of the tower, when (as we have seen) it closed up the bank, and at the same time opening out again to the southern. I should, therefore, suppose it likely that this would do the same.

There are no regular tides in the Rio Grande; the current commonly runs with the wind, and, as in the River Plata, and I believe all along this coast, S.W. winds raise the water, and north-easters depress it; consequently a vessel may load in the port to 12 feet, as there is almost always plenty of water with the S.W. wind, which blows right over the bar.

The S.W. storms, named *Pamperos* by the Buenos-ayreans, and *Rebojos* by the Brazilians, blow furiously in here in winter, about the full and change. They usually come on with a sudden gust, though the appearance of the sky gives sufficient warning for some time first, and blow very hard indeed for five or six hours, when the wind decreases, and a few days of very fine weather succeed; sometimes they draw round to the South and S.E. before the wind abates, which renders it highly dangerous for a vessel near the coast. As the water is shoal there is a deep ground swell, which sets a ship very fast in-shore. It may be as well to observe that the signals are made in palms, each palm being 9 inches. I am aware that the proper Portuguese palm is somewhat less, but 9 inches is always the calculation made here for the draught of water."

FURTHER INSTRUCTIONS.—The following directions were published from the Department of State, at Washington, on the 16th July, 1842. All vessels bound to Rio Grande of San Pedro do Sul, coming from the northward, should keep in 6, and $6\frac{1}{2}$ fathoms of water, until they bring the tower to bear N.N.W., when they will see the pilot boat on the bar, and the tower, with a red flag hoisted, which is the signal to approach the bar to enter. If the flag on the tower is hauled down, vessels should lay off and on until it is again hoisted, and, when they cannot get in, they should keep under sail if the wind is from N. to N.E. The winds that prevail, generally, after mid-day to dark, are E.N.E. to East, from December to April; and, when unable to get in during these months, they can anchor in 7 or $7\frac{1}{2}$ fathoms of water, bringing the tower to bear N.N.W. If preferred to keep under-way, they ought not to approach the shore to less water than 7 or $6\frac{1}{2}$ fathoms, and to stand to sea as far as 14 fathoms water.

Vessels coming from the south should keep in 6 fathoms water, until the tower bears North, the wind being from West to S.E.; the course in is North and South with the tower. If not able to enter, and wishing to anchor, it should be in 7 fathoms, the tower bearing North and South; this from May to November, when the prevailing winds are West to S.E. Vessels should not draw over 16 to 17 palms bound to this place. The wind being from S.W. to S.E. is the highest water on the bar.

The preceding directions are good, so long as the bar remains to the southward, but it happens that every 4 or 5 years it changes, and will next be S.E. and E.S.E. Navigating during the night, along the coast, the bottom, both to the north and south, is sand of different kinds,—but muddy bottom is in front of the bar, and a vessel should keep within as short a distance as is practicable.

N.B.—The palm is about 9 English inches. The signals, for vessels to hoist, are the same as hitherto. When crossing the bar, vessels should follow the pilot boat, and luff or fall off in the direction the flag is pointed by the boat.

In 1845 the following appeared in the *Shipping Gazette*:—"When you make the tower, endeavour to get it to bear north 5 or 6 miles, then steer direct for it, but

be particular to observe if a red flag be hoisted on the tower; if so, it signifies that you must approach and continue to advance (as long as the flag is up,) direct for the tower, until you see a boat, which will beat anchor on the bar, in which a pilot will be situated to show flags, which represent the depth of water on the bar, as follows:—

A blue flag over a red flag	10ft.
A red flag over a blue flag	10½ft.
A blue pendant over a white flag.....	10ft. 10½in.
A white flag over a blue pendant.....	11ft. 3in.
A blue pendant over a blue flag	11ft. 7½in.
A blue flag over a blue pendant	12ft.
A blue pendant over a red flag	12ft. 4½in.
A red flag over a blue pendant	12ft. 9in.

Steer for the boat, guiding yourself by a staff with a flag, which is inclined by the men in the boat as follows:—If the staff is held upright, it denotes you are steering correctly. If the staff be inclined to the port or starboard, you may luff or keep off accordingly. If the flag on the tower is hauled down you must not approach. From the tower they also throw out laurel flags, particularly in rough weather, to guide vessels keeping off, or luffing, accordingly as the flags are shown to north or south.

There is good anchorage 6 miles from the tower, which bears N. 6 miles distance; but as a general rule it is best to avoid anchoring. At night, keep in 10 fathoms water, or over, and be very careful to sound frequently when your head is to shore. The soundings diminish regularly to 5 fathoms, which is close to the breakers. On the beach to the south of the bar the water decreases gradually, but to the northward it shelves more suddenly. Pilotage inwards or outwards over the bar, 280 rees per ton. Up to the harbour, 816. Anchorage, 50 rees per day, per Brazilian ton. Consul's fees, 87, 25".

Lighthouse.—In the month of May, 1852, a notice was issued that a lighthouse had been erected at this port, which is of a pyramidal form, and 110 feet above the ground, or 104 feet above the level of the sea: it has a diameter of 15 feet at the base, and 7 feet 9 inches at the top. "It is 44 feet above the old one, and 277 towards the N.E., with clear weather, it will be seen from 25 to 30 miles; and makes its rotations in 3 minutes, presenting three views of bright light, three darker, and three eclipses. Signals will continue on the old watch-tower, to call vessels into port."

RIO DE LA PLATA OR RIVER PLATE.

GENERAL REMARKS.—Vessels bound to the Rio de la Plata should make the land of Cape St. Mary, which lies in latitude $34^{\circ} 39' S.$, and longitude $54^{\circ} 9' W.$; this may be considered the northernmost point of entrance to the Rio de la Plata; the point is low, with several rocks about it, and the direction of the coast, to the westward of it, is more westerly than at any other part northward of it. About 6 miles north of it is or was a house, and a row of trees is to the northward of the house, which are very remarkable; a mile S. of this house is a bluff point, with a few rocks at its foot, which, being different from the rest of the coast, will readily be distinguished: the general character of the coast is a sandy beach. By these marks the cape may be easily known, when running down the coast near it; between it and the Palmarones, to the northward, there are 10 and 11 fathoms, at a little distance from the shore.

It is advisable not to make the land to the northward of Cape St. Mary.

for although there appears no real danger, yet the water in some places, is shoal a long way off the land, and would alarm strangers; but, in approaching the land, allowance must be made for the current which sets to the southward with N. and N.E. winds, and with S.E. winds the contrary.

WINDS, &c.—The following remarks are by Captain Heywood, adding merely the correction of his positions:—"At the entrance of the River Plata, the prevailing winds, during the summer months, from September to March, are north-easterly, with tolerably clear weather over head, but a dense atmosphere near the horizon. These winds haul gradually to the eastward as you advance up the river; and about the full and change of the moon, strong breezes from the south-eastward are common at this season, accompanied with rain and foul weather. At Buenos Ayres, during the summer months, the S.E. winds are generally fresh in the daytime, hauling round to the northward in the night.

During the winter months from March to September, the prevailing winds, at the entrance of the Plata, are S.W., or more westerly; but, up the river, more generally from the northward, than from the southward, of west. The winter season is the best, in point of weather, at Buenos Ayres; for the winds being chiefly from N.W. to S.W., the water is smooth, and the communication can be kept up between the shore and the shipping with more facility. The weather is sometimes, but not frequently, foggy. Fogs are most common in the months of July, August, and September; and prevail more at the entrance of the river, as far up as the S.E. tail of the Ortiz, than above the banks.

TIDES, &c.—As it cannot be said that there are regular tides in the River Plata, but currents as uncertain in their duration as they are irregular in their rate and direction, no certain allowance can be made for them; therefore a ground-log should always be used, to find the course made good and distance run. The tides, speaking generally, when the weather is fine and settled, and winds moderate, do not, in any part of this river, rise or fall more than 5 or 6 feet; though at Buenos Ayres, at the distance of 8 miles from the city, we found in the Nereus, when the winds were strong at N.W., so little, sometimes, as 15 feet water; with strong breezes at E.S.E. to S.S.W., the depth was upwards of 5 fathoms; but, except on such extraordinary occasions, we had between 17 and 22 feet water.

The River Plata has many singularities; which I think may, in a great measure, be accounted for, from its formation being so different from any other known river. Its entrance being very wide and very shallow, it is affected by every change of the wind in a most extraordinary manner; so much so, that a shift of the wind may be predicted almost to a certainty, by observing carefully the state of the mercury in a barometer, and the set of the currents, which usually shift before the wind. In calm weather the currents are generally very slack: and then as regular, almost, as tides; setting up and down the river alternately. When the winds are variable, the currents are equally so; and I have known the ship to be current-rod four different ways in less than 6 hours. When then the current comes in from the eastward, along the north bank of the Plata, a north-easterly wind may generally be expected to follow; and at the same time (should the wind have been previously to the S.E.) the mercury in the barometer will fall a little; but much more if the transition be quick from South-west without stopping in the south-eastern quarter.

When the wind continues in the North-east quarter, the mercury is more depressed (according to its strength) than with any other wind; and there is usually, *then*, a set *into* the river on the North bank, and *out* on the *opposite*.

Indeed, whilst the winds are between N.E. and S.S.E. the current generally runs to the westward past Monte Video, though without much augmenting the depth of the water off that place, but filling the river above the banks.

The winds between N.N.E. and W.N.W. make the water the lowest: the out-set being then strongest along the South bank of the river, past the Points del Indio and Memoria; but very inconsiderable along the North bank.

Before the setting in of a S.W. gale, or *Pampero*, the weather is usually very unsettled, and the winds unsteady and variable in the northern and north-western boards, preceded by a considerable fall in the mercury; though it usually rises a little again before the wind shifts to the South-west; and often continues to rise, even though the wind may increase from that quarter.

Before these winds set in at Buenos Ayres, the current runs up and fills the river unusually high; at the same time as strong an *out-set* is experienced along the North bank, which continues whilst the winds are strongest from W.S.W. to South—seeming to prove that these winds force up, from the southward, a large accumulated body of water past Cape St. Antonio, which can only find a passage out again by the North shore, where they increase the depth of water, as well as up the river, and particularly in the shallow harbour of Monte Video. Whilst the S.W. winds blow, the air is cold, and the atmosphere clear and elastic, in a degree rarely to be met with in any other part of the world. They are generally succeeded by some days of fine serene weather; the wind continuing moderate from the southward, or varying to the eastward.

I have never known the velocity of the tide or current, in the River Plata, anywhere to exceed 3 knots per hour; but I have heard it said, by some, that they have found it run at the rate of 6 or 7 miles an hour.

As the winds outside the River Plata, and particularly about Cape St. Mary, are most frequently from the north-eastward and northward, except when the S.E. summer, and S.W. winter gales blow, about the times of new and full moon, I consider it, on the whole, most advisable for ships bound into the river, to get in with the land about the latitude of that cape, which is $34^{\circ} 39' S.$, and its longitude $54^{\circ} 9' W.$ of Greenwich, or $2^{\circ} 9' E.$ of Monte Video.

SOUNDINGS.—In latitude $33^{\circ} S.$ the bank of soundings extends off the land full 36 leagues; where the depth of water in longitude about $50^{\circ} 20' W.$, is 94 fathoms; and the quality of the bottom dark olive-coloured mud or oaze, as it is all along the outermost verge of the bank.*

In latitude $34^{\circ} S.$, and 30 leagues from the land, the bank is steep; and the soundings decrease quickly, in standing to the westward to 25 fathoms, 20 leagues from the land.

In latitude $34^{\circ} 20' S.$, and about 30 leagues east of the Great Castelhos Rock, the depth is 63 or 64 fathoms, dark mud. In standing in for the land, between the Great Castelhos and Cape St. Mary, the water shoalens, in a short distance, from 60 to 25 fathoms; and the quality of the bottom changes to sand, which becomes coarser as you approach the coast; and as far as

* LAUREL SHOAL, OFF THE RIO DE LA PLATA.—The Laurel, M'Donald, from London to Valparaiso, put into the River Plata, on the 19th June, 1822, having been obliged to bear up, to repair some damage sustained by a heavy sea breaking on board her. The master reports as follows:—That on the 15th June, discovered a shoal, in latitude $36^{\circ} 28' S.$, longitude $51^{\circ} 30' W.$: that it appeared to be about a mile long, and the same in breadth, with a breaking very high over it; that it had the appearance of sand, and little water on it. He passed within half a mile, and then hove-to, sounding with 90 fathoms of line, and found no bottom. He farther states, that he had a good chronometer on board, and was six miles out of his longitude when he made the port of Monte Video.

seven leagues off-shore, is intermixed with shells. This bottom is found only in, and to the northward of, the latitude of Cape St. Mary, unless very close in with it.

To the southward of $34^{\circ} 40'$ S. the bottom is chiefly mud, intermixed with fine sand or gravel; and if a ship happen to be set to the southward of Cape St. Mary, as she hauls in for the land, yet keeps to the northward of Lobos, she will get out of fine sand into dark mud: which is the quality of the bottom (chiefly) between Cape St. Mary and Lobos; as well as 8 or 9 leagues to the eastward of that island; and the depth of water between them is generally 26 to 20 fathoms.

In latitude 35° S., and longitude about $52^{\circ} 14'$ W., or 42 leagues *true* East of Lobos, there are about 90 fathoms of water, dark sandy bottom; from whence the bank of soundings takes a S.W. direction. East of Lobos, 27 leagues, the depth is 25 fathoms; and in steering in, on its parallel, the same depth, nearly, continues till very near that island. But, if set a little to the southward of Lobos, the water will shoalen even to 10 fathoms, perhaps on a hardy sandy or gravelly ridge, that extends all the way from the English Bank, in its parallel, as far as 18 leagues to the eastward of the meridian of Lobos.

Thus the approach to this river cannot be considered dangerous, if proper care be taken in navigating, and due attention paid to the lead, and to the course steered.

The following are the Honourable Captain Bouverie's description of Cape St. Mary, &c., which I believe to be very correct, and his direction judicious:—

'Cape St. Mary is a bluff point, with a few rocks about it. The direction of the coast, to the westward of the cape, becomes more westerly than at any other part northward of it. About 6 miles north of it is a house, with a row of trees northward of the house, (probably a fence of high prickly pear-bushes) which is very remarkable.

About a mile south of the house is a bluff point, with a few rocks at its foot, which is remarkable being different from the rest of the coast, the general character of which is a sandy beach. One cannot fail knowing the cape by these marks, running down the coast near it; if you are at any great distance off, you will not perceive them. The water, off Cape St. Mary, is shoaler than to the northward; to the north-eastward of the cape, between it and the Islet Paloma, you have 10 or 11 fathoms at a little distance from the shore.

Ships, in general, make the land with North or N.E. winds, therefore, it is best to keep in the latitude of the cape, or a little to the northward of it, till you get soundings, as the current sets to the S.W. It is better not to make the land north of the cape,—not that I believe there is any absolute danger,—but the water in many places is shoal a long way off the land, and would alarm anyone not acquainted with that circumstance.

In latitude $33^{\circ} 27'$ S., and longitude about $52^{\circ} 9'$ W., is a shoal, where we found 9 fathoms of water; I believe it is a ridge running in that parallel of latitude, all the way to the shore. In latitude 34° S. is some tolerably high land, on which is a Spanish fortress, named Fort Teresa. It is square, with bastions at the angles; it has three guns in the face, and one in the flank, and stands about a mile from the beach. About 6 leagues N.N.E. from it is a mark set up, as the termination of the Spanish territories

Being in the latitude of Cape St. Mary, and having got ground in 28 or 30 fathoms of water, fine sand and shells, you may reckon yourself 20 leagues off shore; with from 15 to 20 fathoms, sand and clay mixed, you are not far

off the land. When you have not seen the land before night, be sure to keep to the northward of the cape by your reckoning, to allow for the current, which sets to the southward. This is the case with the above-mentioned North and N.E. winds; with South and S.W. winds the current runs strong the other way.

I am inclined to think that the strong north-easterly currents, which are to be met with off the mouth of the Plata, when the wind is about to blow, or blowing, from the south-westward, do not extend much, if at all, beyond the bank of soundings.

Agreeing in opinion with Captain Bouverie, that, generally speaking, it is advisable to make the land about Cape St. Mary, I would also recommend, if the wind should be anywhere between S.E. and N.N.E., to enter the river on the north side of the English Bank, passing Lobos, on either side, according to the wind and state of the weather. There is a good passage between Lobos and the main, having 17 to 14 fathoms of water.

The Island of Lobos is in latitude $35^{\circ} 1' S.$, and longitude $54^{\circ} 55' W.$, or $1^{\circ} 24'$ East of the Monte Video. It bears about S.W. (*true*) from Cape St. Mary, distant 42 miles.

When within 3 or 4 leagues of Cape St. Mary, in 17 or 18 fathoms, S.S.W. by compass is a fair course to steer for passing outside of Lobos in the night-time; for, with the wind from the eastward, or N.E., the set along-shore into the river must be guarded against. Steering this S.S.W. course, the depth of water will increase to 20 and 22, and some casts, perhaps, of 25 or 27 fathoms (if you are set neither to the westward nor to the southward of it); and the bottom will change, first to sandy mud, and then to dark blue mud, as you approach to the latitude of Lobos. If you are set to the southward, in steering S.S.W., you will not deepen so much; the bottom will keep sandy; and when you approach the latitude of Lobos, you will have no more than 19, 18, and 17 fathoms; but if you are set to the southward of Lobos a few miles, you will have hard casts of from 16 to 10 fathoms, and may rest assured of being on the parallel of the English Bank, and may therefore make a west-northerly course *true*, till you find the bottom soften; as it is all dark blue or greenish mud, in the channel, between the foul ridge of the English Bank and the North shore, all the way up to Monte Video, in the fair-way from Lobos. When off Lobos, if the weather threaten, and it should be likely to blow, a ship will find safe anchorage in the harbour of Maldonado, sheltered from southerly winds by the Island of Goriti, which bears N. $42^{\circ} W.$ *true*, 11 or 12 miles from Lobos. As I have never been in Maldonado myself, I shall insert here what Captain Bouverie says about it.

MALDONADO BAY.—‘The Spanish surveys of this bay lay down a sufficient depth of water for any ship between every part of the island and the main; however, it cannot be safely entered, but by small vessels, except to the westward, and you must not go farther in than to bring the N.W. point of Goriti to bear S.S.W. $\frac{1}{2} W.$, or S.W. by S. by compass, with $4\frac{1}{2}$ or 5 fathoms, good strong clay. With southerly winds there is, in the east passage, a heavy swell, and the water, from the ground being uneven, breaks almost the whole way across, in bad weather. The Diomedé (50-gun ship) passed through to the anchorage before its dangers were known, and had not less than 18 feet; but there are places where there is so little as $1\frac{1}{2}$ fathom, and it is very irregular. There is a bed of rocks to the south of Goriti; the marks for it are, the tower of Maldonado North, and the outer part of Point del Este, E.N.E. $\frac{1}{2} E.$

In the direct line of the entrance of the bay, from the westward, is a bed

of rocks where there are parts having only 3 and $2\frac{1}{2}$ fathoms. The bearings, taken on the rocks, are N.E. point of Goriti E. $\frac{1}{4}$ S.; N.W. point of ditto, E. by S. $\frac{1}{4}$ S.; S.W. point of ditto, S.E. by S.; Point Ballena, W. by N. $\frac{1}{4}$ N.; the hill of Pan de Azucar, just within the extreme of Point Ballena.

In mid-channel, between these rocks and the island, are $6\frac{1}{2}$ and 7 fathoms; their distance from the island is about three-quarters of a mile. There are seven fathoms close to them all round the western side. The watering-place is on the main, close by a battery; the stream loses itself in the sand, except when swollen by heavy rains, and you have to roll your casks about sixty yards over the sands; the water is very good.

LOBOS TO FLORES, &c.—Having Lobos bearing N. by W. by compass, distance 3 or 4 miles, you will have about 18 fathoms; and in making a compass course, W. $\frac{1}{4}$ S., by ground-log, (having due regard to the wind and current at the time,) you will make the Island of Flores ahead of you. In this track your soundings will gradually decrease from 18 to 12 fathoms, due South of Black Point, and to 7 or 8 fathoms when you approach within 9 or 10 miles of Flores.

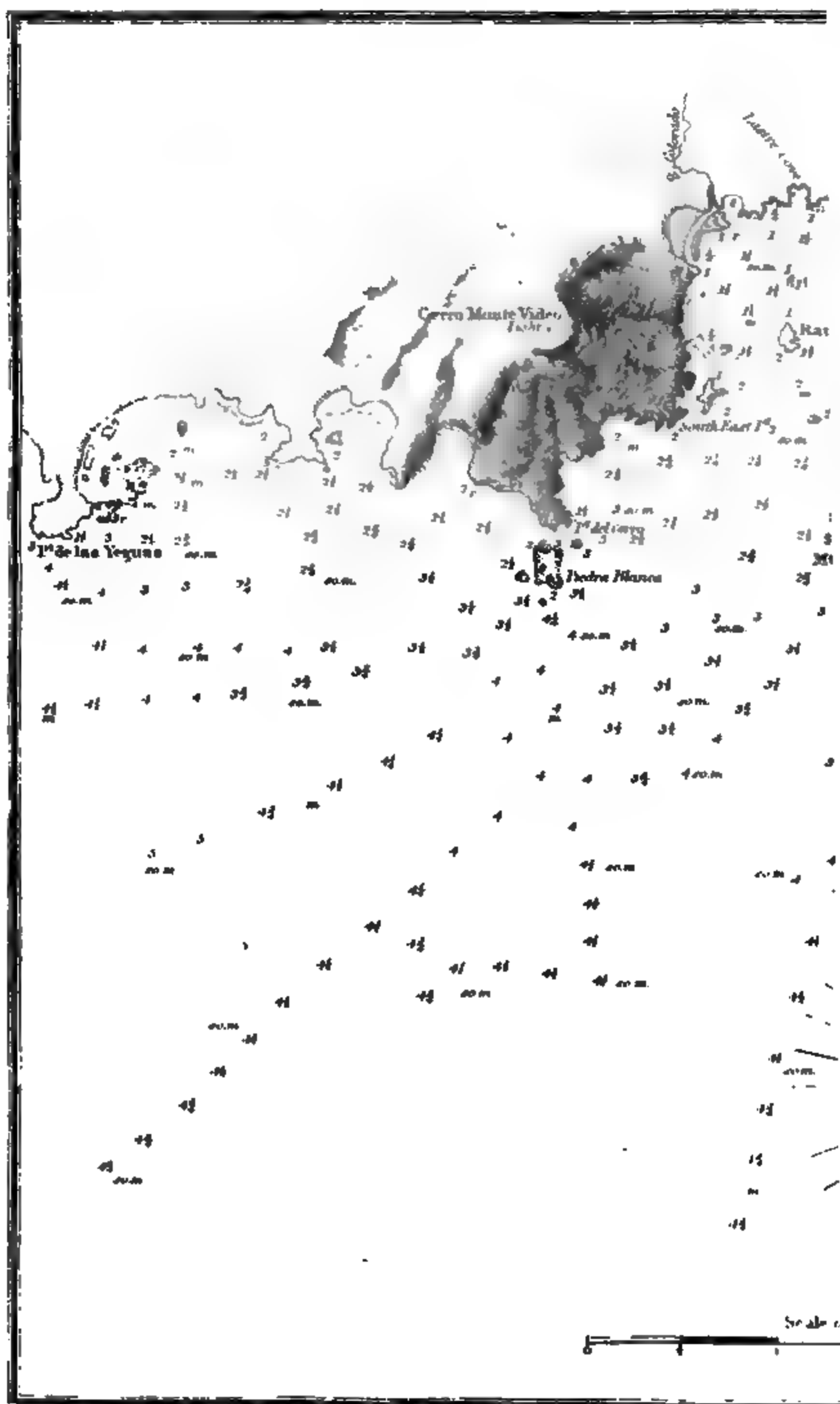
Though Captain Bouverie says, 'You may run quite up to Monte Video, either by night or day, by making a due West course, first trying the current to make allowance for it;' and though I have frequently done it myself; yet I would not recommend it as a general rule to be followed by strangers to the River Plata. Great care and attention to the course made good, and to the soundings, are indispensably requisite in those who attempt to conduct vessels, during the night, in any part of this river; and even these have been but too often insufficient to save ships from destruction. But, in merchant vessels, I fear we cannot always expect to find those qualities, and, therefore, I withhold my opinion of its being advisable for them to run in the night; neither can it be done by men-of-war without some risk.

FLORES bears W. $40^{\circ} 30'$ N. (*true*) from Lobos, distant 52 miles. It lies nearly N.E. and S.W., has a small hummock in the middle, and one at each end, that to the S.W. being 39 feet high. Between these the land is low and marshy, and overflowed sometimes between the central and N.E. hummock. It may be seen at the distance of 5 or 6 leagues from a ship's deck, in clear weather. On this island there is a lighthouse, showing a light revolving every 3 minutes, which can be seen 15 miles off. It is said to be badly attended to, and very frequently not lighted at all.

There is good anchorage all round the island; but a reef extends in a N.W. direction from the north point about a mile. Seals and sea-lions, and various aquatic birds resort to this small island, as well as to Lobos; and, in the months of August and September, great quantities of very excellent eggs may be procured. With the wind easterly, boats may land on the western side of Flores, particularly in a small cove, very near the S.W. part of the island.

ENGLISH BANK, &c.—From Flores W.N.W. the Caretas Rocks (above water) are distant about 5 miles, being separated by a depth of about 5 fathoms; there are also other shoals between Flores and the main, whose situations have not been satisfactorily ascertained.* True South, at the distance of 11

* I beg to inform you that the *Nautilus* transport, on her passage to Monte Video, struck on a sunken rock in the Río de la Plata, between the Isle of Flores and the Carretas Reef; the lighthouse on the south-west end of Flores bore E. by S. $\frac{1}{4}$ S., the high land about Bold Point W. by S. $\frac{1}{4}$ S. The ship passed over, having struck four or five times. Immediately the anchor was let go, and the boat



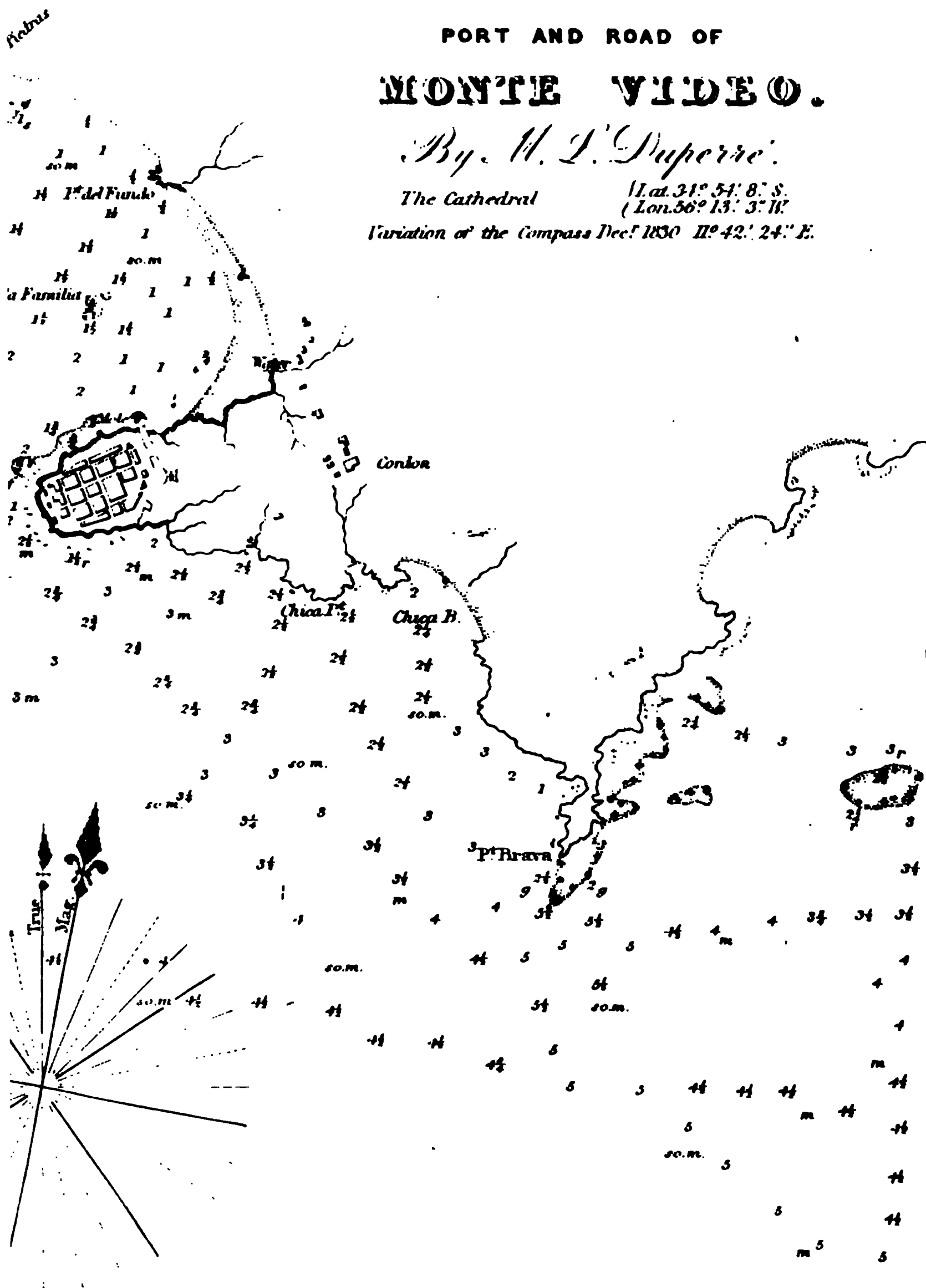
PORT AND ROAD OF MONTE VIDEO.

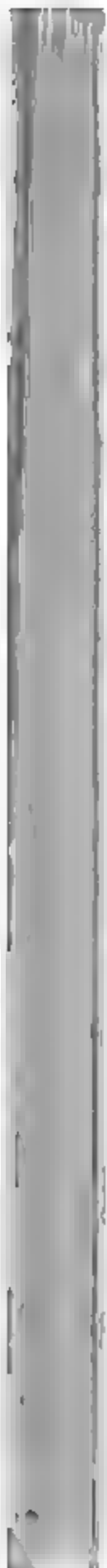
By M. J. Duperre.

The Cathedral

(Lat. $31^{\circ} 54' 8''$ S.
(Lon. $56^{\circ} 13' 3''$ W.)

Variation of the Compass Decr 1830 $11^{\circ} 42' 24''$ E.





miles from Flores, is the north part of the English Bank, on which, in that latitude, $35^{\circ} 8' S.$, there are about 12 feet water. The depth of water, between Flores and the English Bank, is 7 fathoms, all the way across, to within a very little distance of both. The English Bank, in latitude $35^{\circ} 12'$, generally breaks; and, with a low river, is above water in some places. Its extent to the southward has not yet been accurately defined; and, for 70 or 80 miles to the south-eastward of it, the ground is said to be foul and uneven, and has not been well explored.

Between the Archimedes and the English Bank there is a swatch of 5 fathoms water, (according to Captain Beaufort, of the Royal Navy, who explored these banks in 1807) and as many miles wide.

The shoalest part of the Archimedes Bank, about $2\frac{1}{2}$ fathoms, is 4 miles in extent, about N. and S. by compass, and there are 4 fathoms all round it. The centre of it is in latitude $35^{\circ} 12' S.$, and the Monte Video bears N. $22^{\circ} W.$, from it, distant 20 miles. Besides this bank there is said to be a small knoll, in latitude $35^{\circ} 14' S.$, which is true South from the Monte Video, 21 miles, and has not more than $3\frac{1}{2}$ fathoms of water on it, and about 4 fathoms all round it.

MONTE VIDEO.—Passing to the southward of Flores, at the distance of a couple of miles, you have $6\frac{1}{2}$ or 7 fathoms, and may steer W. $\frac{1}{2}$ S., by compass, to pass Point Brava, which bears true W. $4^{\circ} N.$, distant four leagues from the S.W. end of Flores. This point is bolder too than the land to the westward, between it and the town of Monte Video, and may be passed close, in $4\frac{1}{2}$ or 5 fathoms, at a mile or a mile and a half distance. The best anchorage for a frigate off the town of Monte Video, is with Point Brava bearing, by compass, W. by N. $\frac{1}{2}$ N.; the cathedral, N.E. by N.; and the Mount about N.W. by N., in $3\frac{1}{2}$ or 4 fathoms, at 2 miles or more from the town, with the harbour quite open. The bottom is all soft mud.

The harbour of Monte Video is very shoal, having only from 12 to 15 and 19 feet water; but the bottom is so very soft that vessels receive no damage by grounding there. Captain Bouverie says, "A S.S.W. wind, which blows right into the harbour, and causes a good deal of sea, always occasions the water to rise a fathom or more.

In a long continuance of fine weather, the tides sometimes assume the appearance of regularity, but this is not often the case; they are governed entirely by the winds. The winds from the southward cause the water to run out, on the north shore, strongest. Fine weather, and a N.W. wind, make the water lowest. It is usual, in Monte Video harbour, to have an anchor in the S.E., and another to the S.W., and to take one in abaft from the northward, for the water, forced in by the southerly wind, sometimes rushes

sent away, and found 17 feet water on it, and $5\frac{1}{2}$ and 6 fathoms close to it. I believe that the rock is laid down in the Spanish charts, and that H.M.S. Nereid struck on it many years ago. W. C. SAUNDERS, *Agent for Transports.*

If there was any doubt of the existence of this rock, it is now confirmed, as it was met with by a Captain Blain, who has kindly furnished us with the following particulars:—"It has but 12 feet water on it, and is very dangerous, as there is but little or no warning given by the lead. The position, according to my bearings, I made to be about mid-way between the Carretas Shoal and the Flores Light, the former bearing N.W. by N. $2\frac{1}{2}$ or 3 miles, and the latter E. by N. about $3\frac{1}{2}$ miles. I had great difficulty to avoid being wrecked on it.—October 9th, 1851."

A rock, which we presume to be the same, but with an evident discrepancy in the bearings, caused the wreck of the brigantine Skjold, on January 14th, 1849, the captain of which gave the following bearings of the danger, but represented it to have only 6 feet water on it: the Mount of Monte Video W. $\frac{1}{2}$ N., and the Capitanía at Bereio in one with the windmill at Oribe's encampment N. by W. It will be observed that these bearings hit in lat. $34^{\circ} 57' 30'' S.$ and long. $56^{\circ} 5' W.$, in a position to the south-west of the previously-mentioned rock.

out with astonishing rapidity, when the anchorage to the north is of the greatest service."†

The MOUNT VIDEO is in latitude $34^{\circ} 54' 8''$ S., longitude $56^{\circ} 13' 3''$ W. of Greenwich. On the summit is a lighthouse which shows a revolving light at an elevation of 486 feet above the sea, visible about 30 miles; the light is visible for 30 seconds once in 3 minutes. At the base of the mount are several runs of excellent water, particularly in two small, smooth, sandy bays, on the S.W. part of it, where ships in the outer roads may supply themselves with ease; and another on the east side of the mount, just abreast of Rat Island, adapted to ships in the harbour.

Giving the preference to the passage on the south side of the English Bank, especially when the wind is anywhere between S.S.E. and N.N.E. on passing Lobos, because it may be expected most probably to shift, if it does at all, round by the north to the westward, though, perhaps, not before that wind, and the inset together, might carry a ship up to Monte Video. Yet if the wind should be to the north-westward, at the time of making the land, it may be pretty confidently expected to shift next to the Westward or S.W.; and, therefore, a ship should not strive to beat up, round Lobos and the north channel, against an outset, but stand at once over towards Cape St. Antonio, where, by the time she could stretch across, she would most likely find a S.S.W. wind and N.W. current to run up with, along a weather shore to Buenos Ayres, or to Monte Video, if bound thither, passing to the westward of the Bank of Archimedes, in about 5 fathoms water; or, if the mount should be seen in good time, never to bring it to bear to the westward of North, by compass, till within 5 leagues of it.

In standing to the southward, from abreast of Cape St. Mary, with the wind south-westerly, a ship will have from 18 to 24 or 25 fathoms when in the latitude of Lobos, and about 12 or 13 leagues to the eastward of it; and making a S.S.E. course, the water will then shoal to 18, 16, 12, or 11 fathoms, in crossing the ridge, which is generally composed of sand, gray speckled, mixed with stones, hereabouts; after which the depth increases gradually to 35 or 36 fathoms, over a sandy bottom, in latitude $35^{\circ} 40'$ S., and longitude about $53^{\circ} 25'$ W. In the latitude of 36° S., and 15 or 20 miles farther to the eastward, you will deepen off the bank entirely. A ship, having got as far to the southward as 36° S., may consider herself in the fair-way for proceeding up on the south side of the English Bank; and, if the wind serve, a true West course may be made good.

In latitude 36° S. the depth of water on the meridian of Cape St. Mary, is 38 fathoms, and the bottom of fine gray sand, like ground pepper.

Keeping still to the westward, on that parallel of 36° S., the depth de-

* DECREES FROM MONTE VIDEO, 1836.—“In consequence of the greater portion of the foreign vessels which arrive from ports in which consuls of the republic reside, and entering their cargoes without having their manifests certified by the said consuls, the government, in order to put a stop to a system so prejudicial, have ordered and decreed:—

“Art. 1.—The captains of merchant-vessels, proceeding from foreign ports in which consuls of the Republic reside, who present their manifest without being certified by the said consul, will be subject to an additional duty of 6 per cent. on the value of the goods.

“2.—The decree of the 17th of January, 1834, remains in full force, respecting vessels arriving from ports in which no consul resides.

“3.—They except those from the foregoing vessels which arrive from free ports, to whatsoever nation they belong.

(Signed)

OREBE J. M. PEREZ.
J. M. REYERS.”

A second decree states that the enforcement of the above would, for vessels from Europe, commence in April, 1836, as also for vessels from America.

creases to 19 or 18 fathoms, true South of Lobos; and for ten leagues farther you have from that to 15 fathoms. But if from the latitude 36° S., on the meridian of Lobos, you make a W. by N., or W. by N. $\frac{1}{4}$ N. course, true, you will shoal the water to 8 or $7\frac{1}{2}$ fathoms, in latitude $35^{\circ} 45'$ S., on the meridian of the English Bank. The quality of the bottom, generally in this track, is sandy, mixed with small stones; and the nearer you approach to the ridge of the English Bank, it is intermixed with bits of shells, and sometimes with clay or mud.

From latitude $35^{\circ} 45'$ S., due S. of the English Bank, a W.N.W. true course to latitude $35^{\circ} 33'$ S. will bring the Monte Video to bear North, in about $6\frac{1}{2}$ fathoms, mud, at the distance of thirteen leagues from Point Piedras; and, from this position, the same true course may be made to raise the land about Point del Indio, if bound up to Buenos Ayres; or N.W., or more northerly, to get sight of the Mount Video; having due regard to the set of the current, up or down the river, that you may neither be horsed on the S.E. tail of the Ortiz Flats, nor on the western part of the Archimedes Bank. The bottom above this is soft mud, or clay, in the channels fit for safe anchorage. In latitude $35^{\circ} 30'$ S., or thereabouts, and due south of the Archimedes Bank, or some miles farther to the eastward, I have been told by some persons they have had as little as 4 fathoms, hard ground.

Potomac Bank.—"On the 13th December, 1839, the United States frigate, Potomac, left Monte Video, with the wind E S.E. at the time, and while steering N.W. by N., by compass, believing themselves to be about 5 miles from the ravines of St. Gregory and St. Lucia, the leadsman having at the previous minute got a cast in 4 fathoms, the ship ran aground in 17 feet water, drawing at the time 20 feet 6 inches. She was cleared of everything excepting her ballast and lower masts, and, after remaining fast until the 24th of December, by great exertions she was hove off S. by W.,—their efforts to heave her off stern foremost having proved ineffectual, and her tendency being to clear away the sand and mud forwards, where she was less deeply immersed than aft; when she floated she drew 17 feet 6 inches. The wind was S.E. when she got off, fine weather, with a remarkably high river. During the eleven days they were aground, the least water they had alongside was 12 feet, the most (the day she hove off) 18 feet. The surface of the shoal consisted of a light-coloured quicksand, but about 3 feet was mud and shells. When the Potomac was aground *the true* bearings of Santa Maria, and the ravines of St. Gregory and St. Lucia, were N.W. and N.E."

MONTE VIDEO TO BUENOS AYRES.—Ships leaving Monte Video, to proceed up to Buenos Ayres, must be very attentive to the lead, and the course steered across the river must be very carefully regulated by the set of the current at the time. If the weather be sufficiently clear, the Mount is the most sure guide, keeping it by an azimuth compass, on the magnetic bearing of N.E. by N; and, when it sinks to an eye in the top, a more westerly course may be steered, to raise the land about Point del Indio. This direction is intended to apply particularly to frigates, or any ships drawing more than fifteen feet water, because it is not advisable for them to cross the tail of the Ortiz Flats, much farther to the westward than a true S.W. course from the Mount will take them; for, with a low river, I have had barely $3\frac{1}{2}$ fathoms, in the Nereus, with the mount bearing N. 35° E, by compass, distant ten leagues. At other times I have sunk the mount on a N. 53° E. magnetic bearing, and had as much as $3\frac{1}{2}$ fathoms water, but the river was then well filled.

Off the S.E. part of the Ortiz Bank there is now a light-vessel, from which pilots can be obtained. In the vicinity of the light vessel there are generally, no more, and often less, than $3\frac{1}{2}$ fathoms, the bottom tough clay nearest the bank, and in some places farther to the south-eastward, soft mud, not more than $3\frac{1}{2}$ fathoms.

After sinking the Mount about N.E. by N., and having $3\frac{1}{2}$ fathoms, a W.S.W. course will raise the land (if the weather is clear) about Point del Indio to the eye, at the mast-head, and probably you will not have more than $3\frac{1}{2}$, or, at best, $3\frac{1}{2}$ fathoms. The Mount and land, near Point del Indio, are sometimes visible at the same time.

Point del Indio is in latitude about $35^{\circ} 16'$ S., and $0^{\circ} 56'$ W. of the Mount Video, from which it bears S. 63° W., distant 50 miles. There are little more than 3 fathoms, at the distance of 10 or 11 miles, when the river is in a mean state; farther to the southward, and off Point Piedras, there is only that depth at 14 or 15 miles off shore. Very great caution, therefore, is required in approaching it; and a constant look-out should be kept for the land, as it is very low, and cannot be seen farther than 12 or 13 miles, in any weather, from the deck of a frigate.

When the land is barely raised to an eye 19 or 20 feet above the surface of the water, a W.N.W. magnetic course will lead along-shore, between it and the south part of the Ortiz, which is distant about 14 miles from it; and between them there is nowhere more water than $3\frac{1}{2}$, but mostly $3\frac{1}{2}$ fathoms. With a high river, I have had a quarter-less 4 fathoms. The nearer the Ortiz the deeper the water.

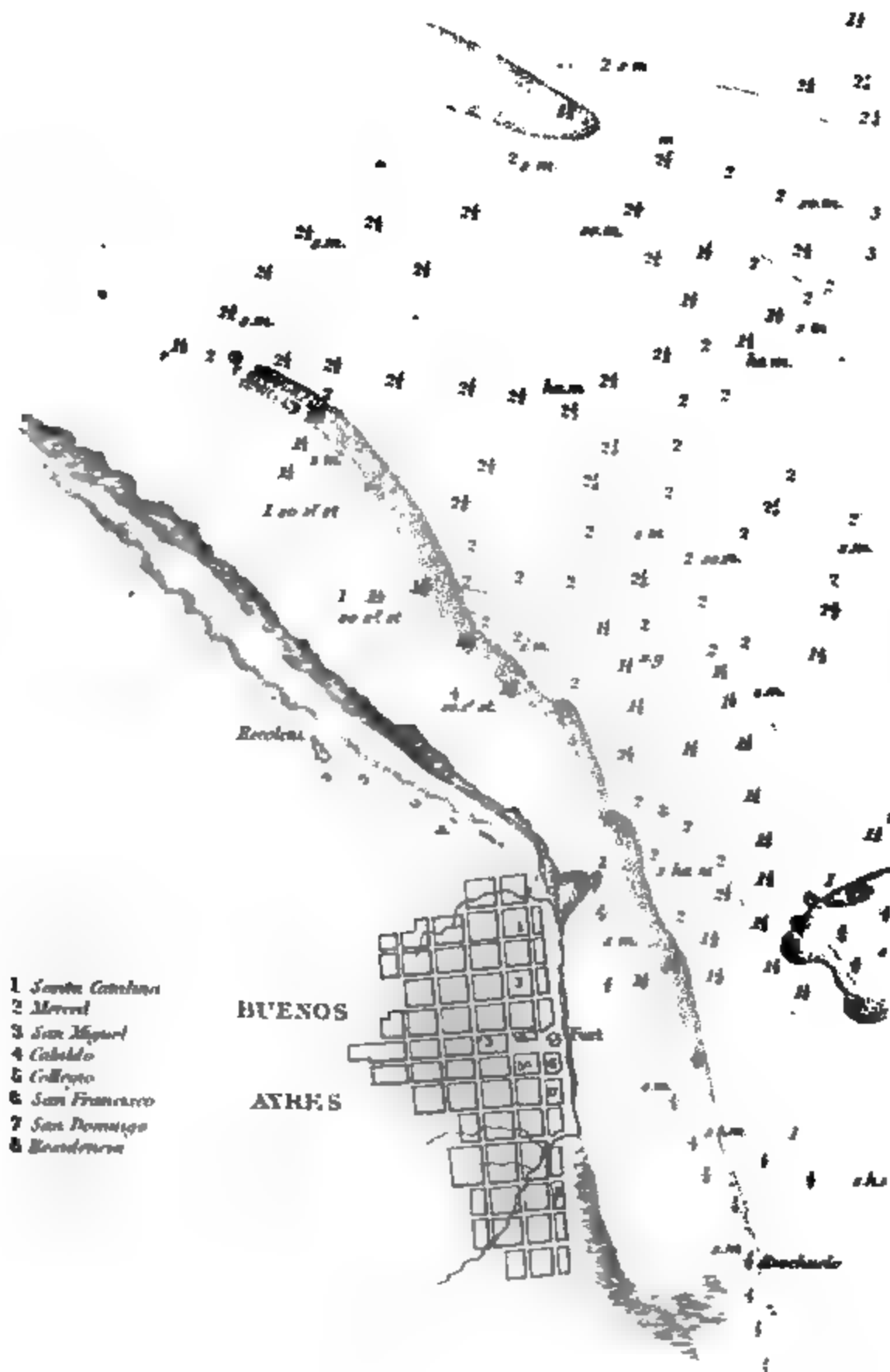
In steering up W.N.W., with the land seen from the deck, (if clear weather), you will have $3\frac{1}{2}$, or $3\frac{1}{2}$ fathoms, (yet if the river is low, perhaps some casts of 3 fathoms,) and raise a remarkable clump of trees, named *Embudo*, which are much taller than the rest, highest at the West end, and lie in latitude $35^{\circ} 6'$ S., and in longitude $1^{\circ} 16' 30''$ West of the Mount Video, or $0^{\circ} 57' 30''$ East of the Cathedral of Buenos Ayres. At some distance to the westward of the *Embudo* trees, there is another clump about the same height; but these being highest at the East end, are sufficiently distinguished not to be mistaken for the true *Embudo*.

When in $3\frac{1}{2}$ or $3\frac{1}{2}$ fathoms, the *Embudo* trees bear by compass W.S.W.; the S.E. end of the Chico Bank will bear W.N.W. or thereabout, 10 or 11 miles from you; and you must now determine, from the water your ship draws, and the then direction of the wind and the state of the weather, whether you will pass between the Chico and the shore, or between the Ortiz and the Chico.

I have passed up and down several times between the Chico and the South shore, in the *Nereus*, lightened her in draught to 18 feet 3 inches; but I would never attempt it again from choice; now I am better acquainted with the middle channel, between the Chico and the Ortiz, and have every reason to believe that the middle ground, some charts lay down in it, does not exist.

A ship not drawing more than 15 feet may take either passage; and of the two, ought perhaps to prefer that to the southward of the Chico Bank, particularly if the wind should be well to the southward, as she might take her soundings from the weather shore, and, keeping in somewhat more than her own draught, run up along it; and by not deepening above 3 fathoms, would ensure being to the southward of the Chico.

CHICO BANK, &c.—The S.E. end of the Chico Bank bears, from the *Embudo trees* N. 32° E. true, distant 10 miles, and E. 9° N. 13 miles from



Atalaya Church. Its latitude there is $34^{\circ} 56' 30''$ S., and longitude $1^{\circ} 9' W.$ of the Mount Video. This bank runs in the direction of N. $52^{\circ} W.$ true, or $l. 65^{\circ} W.$ by compass, about 13 miles to its N.W. end, which is in latitude $4^{\circ} 48' 50''$ S., and $0^{\circ} 47'$ East of Buenos Ayres Cathedral. From this N.W. end, in 14 feet water, Atalaya Church bears S. $14^{\circ} W.$, distant 11 miles; and Point Santiago, forming the Ensenada de Barragan, bears W. $40^{\circ} N.$ 14 miles from it. The breadth of the Chico does not exceed 2 miles or perhaps a mile and a half, and its inner edge is about 9 miles from the shore. The water between it and the shore is nowhere more than $3\frac{1}{2}$ fathoms; and the deepest water is along the inner edge of the shoal, at the distance of half a mile from it, or less in some places. About midway between it and the shore there is a quarter-less 3 fathoms. On some parts of the Chico there is very little water; and within the limits I have assigned to it, nowhere more than 14 feet.

To ships drawing less than 15 feet, it is only farther necessary to recommend care and attention on approaching Point St. Iago, which forms bushy and distinct; and when it is brought to bear to the south-westward, haul out into the stream of $3\frac{1}{2}$ fathoms, to round outside the Spit, which runs about $l. W.$ by compass from Point St. Iago, at least 10 or 11 miles; its extreme point, in 2 fathoms, being about 5 miles from the shore. When two remarkable trees on Point Lara are brought to bear S. by E. $\frac{1}{2}$ E., or S.S.E. by compass, you are past the Spit. This mark will also lead a ship of that draught of water clear to the westward of the Spit, in running in towards the Ensenada.

After passing the Spit off Point St. Iago, in $3\frac{1}{2}$ fathoms, a W. by N. northerly course by compass will lead up to the outer road of Buenos Ayres, where any ship may safely anchor in the water she draws, if the river be low.

Frigates, or any vessels drawing more than 16 feet water, should barely raise the land about Point del Indio to the eye on deck, and borrow nearest the Ortiz; more particularly when the Embudo trees are brought to bear as far as S.W. by W. (magnetic); for with the Embudo bearing from S.W. to S.S.W., the bottom is flat, off to 3 fathoms, full 7 miles from the shore, and chiefly hard clay. Therefore, when the Embudo trees bear W.S.W. by compass, and you are about 9 or 10 miles off-shore, in $3\frac{1}{2}$ fathoms, if you have a leading wind, haul to the N.W. by W., or more northerly, as may be required to clear the S.E. tail of the Chico, and you will soon deepen your water to 4 fathoms, and more, in the middle channel, between the Chico and the Ortiz shoal. The fair course through, between them, is about N.W. by W. $\frac{1}{2}$ W. (magnetic), and, in mid-channel the land can but just be distinguished from the quarter-deck of a frigate. When the Embudo trees bear S. $20^{\circ} W.$ by compass, you will be abreast of the S.E. end of the Chico; and may either make your shoal soundings along its northern or outer edge, to about a quarter-less 4, if the wind is southerly; or if the wind be northerly or westerly, borrow into a convenient depth along the southern edge of the Ortiz. I believe the breadth of this middle channel may be 5 or 6 miles, and the depth of water from 4 to $5\frac{1}{2}$ and even 6 fathoms in the fairway, about the N.W. part of it, and abreast that end of the Chico. The quality of the ground all the way through this channel is generally soft mud, and fit for safe anchorage.

BUENOS AYRES.—The N.W. pitch of the Chico Bank being passed, and the depth of water 5 or $5\frac{1}{2}$ fathoms, you may steer by compass W. by N. $\frac{1}{2}$ N. or W. by N., for Buenos Ayres, taking care not to shoalen under quarter-less 4, off the Ensenada de Barragan, till Point Lara trees bear S.S.E.

At a little more than half-way from Point Lara toward Buenos Ayres, in the *Nereus*, in 19 feet water, and the bottom soft mud, these trees bore, by compass, S. 17° E., the cathedral S. 67° W., and the spire of the Recoleta Convent S. 76° W.: the latitude observed 34° 34' 30" S., and the longitude by the moon 58° 2' W. of Greenwich Variation of the compass 12½° easterly, at the distance of 8 miles from the Cathedral.

Observations on the anchorage off Buenos Ayres, by Mr. R. Thomson, Master of H.M.S. *Imogene*:—" On the 22nd Oct., 1836, we left Monte Video for Buenos Ayres, with a pilot on board. At Monte Video moorings are laid down for the pilot-schooner, which lies with Point Indio bearing S.W. by S., by compass, 10 or 11 miles; and she generally keeps a light at her mast-head. This is a good guide for vessels passing up, enabling them to shape a course between the Chico and Ortiz Banks: or in passing down the river, it enables them to shape a course clear of the East end of the Ortiz, or for clearing the English Bank. In fact, if the vessel can be made, she will always give a new departure; a most desirable object in this uncertain river.

On leaving Monte Video, and bound for Buenos Ayres, if the pilot-schooner be not seen where and when the pilot expects to see her, there cannot be a doubt of her having left her moorings, or that the vessel is not in a proper place. At the time we expected to see her, (which was midnight; and we burnt several blue lights, as well as fired several guns, in order to draw their attention) she was at Buenos Ayres.

Having missed the vessel. or being unable to find her, I would strongly recommend anchoring until day-light, and taking a departure from Point Indio, or the Embudo trees, all well described in the sailing directions for that place.

On the 23rd, we anchored off Buenos Ayres, with the cathedral bearing S.W. by W., Point Guilenas S. by E. ¼ E., about 7 miles from the shore; and, on the 25th, shifted our berth nearer the shore 2 miles, and moored with best bower E.S.E., small bower W.N.W., 50 fathoms each; Buenos Ayres Mill bearing S.W. ¼ S.: this is better anchorage than where we left, as there is generally 4, and sometimes 6 feet more water, and it is full 2 miles nearer the shore.

I cannot say much in favour of the anchorage here, as it is open to all points of the compass, and a great distance from the shore; in fact, the communication with the shore is at all times very uncertain, and we were frequently 3 days without sending a boat; even when they are sent, there is great uncertainty attending their return for a day or two. While we lay there, (8 weeks,) we found the mooring-swivel of great use; it was well tried during the heavy gales we rode out. The prevailing winds were E. and N.E. The tides are very irregular, but at times running as much as 3½ miles an hour. We had from 19 to 25 feet water."

The following are the PORT CHARGES, Entrance at Buenos Ayres.

Foreign Vessels.	Dols.*	National and English.	Dols.	Rials.
Per Ton	1	Per Ton.....	„	6
Health Vi-it.....	12	Health Visit.....	6	„
Copy of Regulations of Port	1	Copy of Regulations of Port	1	„
Clearance.				
Per Ton.....	1	Per Ton.....	„	6
Health Visit	12	Health Visit.....	6	„
		Muster Roll of Ship's Co...	12	„

* The Dollar here mentioned is paper, value about 7½d.

N.B.—Vessels which neither load nor discharge, pay one half the charges, besides the health visit on arriving, and the health certificate on clearing. (Addition since August 1st, 1833.) Vessels of 3 masts pay 90 dollars, and those of 2 masts 50 dollars pilotage, on entering and clearing from the inner roads, although they do not demand a pilot.

PILOT CHARGES.

For Vessels drawing Burgos Feet.	From C. S. Mary to Monte Video.	From Monte Video to Ensenada and Buenos Ayres.	From Cape St. Mary and C. S. Antonio to Buenos Ayres.
	Dollars.	Dollars.	Dollars.
20	720	900	1140
19	600	780	1050
18	540	660	960
17	480	570	840
16	420	480	750
15	360	420	660
14	300	360	570
13	240	270	480
12	210	240	420
11	180	210	360
10	150	180	300

“ All vessels drawing more than 10 feet must take a pilot on clearing ; and in case of refusing so to do, the captain will be obliged to pay one half of the pilot-charges to which he is liable. He also will pay the same, who, on entrance, shall have refused to take a pilot, the same having been offered him, with a list of pilot-charges above stated.

The outer and inner roads are, in fact, open roadsteads, neither of them possessing good anchorage. A strong wind from E. or S.E. blowing almost direct on land, is dangerous to those in the inner roads, and they frequently drive.

It is said that the winter season is much better for shipping than the summer, as in the latter the winds are more from the eastward. Good anchors and cables are very necessary in the River Plata ; chain cables particularly.

In addition to the difficulty of large vessels getting up the river, an adequate freight cannot be procured for them ; but vessels of 150 to 200 tons are the most likely to get employed.

Vessels discharge and take in their cargoes by means of lighters, named Balandras. Should there be the least swell upon the water, these lighters cannot lie alongside. Boat-hire is dear : to the outer roads, 25 shillings English.

The climate, considered generally, is decidedly good. The spring months of September, October, November, and those of autumn, April and May, are the most agreeable parts of the year. During the former we have had some days of oppressive heat, the thermometer ranging from 69° to 85° in the shade. When the heat is at the greatest, a pampero frequently follows, with its accompaniments of rain, thunder, and lightning. These winds from the W. to S.W. blow with great violence : being off the land, they are not very dangerous to shipping ; but the thunder and lightning by which they are accompanied is terrific. A North wind in summer is very unpleasant, the

heated atmosphere relaxing both the mind and the body; added to this, ships are swarmed with musquitoes and numerous other insects.

The beach of Buenos Ayres well deserves its nickname of Wapping, being crowded with sailors of all nations, grog-shops, stores, &c. In no part of the world are masters of merchant-vessels subject to such annoyance from the desertion of their crews. There are crimps here, who conceal them in the town, or send them to the country, and afterwards exact their own price from those who are in want of sailors.

The necessaries of life are abundant, and reasonable in price. The beef is good, but much inferior to English. Vegetables are at all times dear: potatoes imported pay a duty of 50 per cent., and the growth of this invaluable vegetable is not in any way encouraged; I have known them sell at 8d. per lb. In summer, meat will not keep beyond a day. We have been obliged to throw overboard some hundred pounds of beef, slaughtered not more than 12 hours. The poultry is not of the best description. Fish is very inferior; but plenty may be caught alongside. We had no opportunity of trying the seine.

Fuel is scarce in Buenos Ayres, as it is not a woody country. Coals are imported from England.

The exports consist of ox hides, of all descriptions, horse hides, horse hair, wool, tallow, nutria skins, horns, chinchilla skins, and salted beef, (the latter sent chiefly to the Havanna and Brazils,) and a small quantity of silver in bars. Of late years the wool trade has greatly increased. The quantity of European goods annually imported is very great. The cargoes brought from Liverpool, of manufactured goods of Manchester, Glasgow, &c., are of considerable value, often amounting to £100,000.

The state of the tides sometimes causes great delay to vessels leaving the inner roads; days, and even a week, being lost at some periods.

Landing at Buenos Ayres is very bad; heavy boats cannot get near. Carts are used to embark and disembark, there seldom being water sufficient for boats to go close in; and they are, at all times, liable to serious damage from the pieces of rock, wrecks, &c., so near the shore. The cartmen charge one dollar (paper money, equal to 7½d.) each trip."

FURTHER DIRECTIONS.—The following description of, and directions for, the River Plata, are by Capt. Barral, the French surveyor:—

LANDFALLS.—These are three; the *Cape Santa Maria*, the *Isle Lobos*, and *Cape San Antonio*.

Of Cape Sta. Maria the position, determined on land, has been found to be in latitude 34° 39' 1" S., longitude 54° 5' W. nearly. The variation of the needle, Feb. 1831, 11° 7' E. Although of very moderate elevation, this cape may be known by the vicinity of two islets, named Tuna and Paloma, which are separated from each other by a space of 43 fathoms in extent, and which forms a passage for small vessels, drawing less than 10 feet of water; this is the entrance to a cove, sheltered by the cape and the two islets, wherein 7 or 8 vessels may lie in 11 or 12 feet. The Islet Tuna, the nearest to the cape, is covered with the prickly pear. On coming from the offing, in this direction, there will be seen an extensive sand-down, steep-to, followed by a very low beach. To the north, on a hill, is seen a group of houses, composing an *Estancia*, or establishment for the rearing of cattle. Near these houses are some trees, and around are several inclosures. The coast to the north forms a large bay, of 14 miles in extent, with a point encircled by the Islets Palmarones and Castillos. The Islet Palmarones, near the point, is verdant; the Castillos arid and barren. The resemblance of the point to that of Cape Sta. Maria has caused several wrecks. For this reason

the bay has been named False Bay. At 2 miles to the east of Castillos are 14 fathoms of water, bottom of sand. From the Islets of Cape Sta. Maria, at the distance, are 10 fathoms, with sand, or sand and gravel. To the south, at 3 miles, 18 fathoms, sand; and to the S.W. 16 to 20 fathoms, bottom of oaze.

Lobos, or Seal Island, is situate in latitude $35^{\circ} 0' 51''$ S., and longitude $54^{\circ} 49' 22''$ W. It is not a mile in extent, but may be seen 15 or 16 miles off. The eastern part must be avoided, because a chain of reefs extends 3 miles from it into the offing. Large ships pass safely through the channel between the isle and main, in 15 and 16 fathoms of water.

Cape San Antonio.—Under this name we comprehend a line of hillocks, composed of sand, extending to the east and the south, and terminating on the west by a very low coast, covered with shrubs or small trees. The position, determined from the anchorage, is given as latitude $36^{\circ} 19' 36''$ S., longitude $56^{\circ} 42' 22''$ W. Variation of the needle, Dec. 1831, $13^{\circ} 30'$ E. The point determined is at the division between the sand-hills and verdant shore. The cape is surrounded by a sand-bank, which frequently breaks at a considerable distance from shore; it extends to the north and east, and should not be approached without caution.

DESCRIPTION.—The mouth of the Rio de la Plata, between the east point of Maldonado, on the north, to Cape St. Antonio, on the south, is 42 leagues in breadth. The bearing from one to the other is S.W. $\frac{1}{4}$ S. (S.W. $\frac{1}{4}$ W.). An extensive bank, with several shoals upon it, occupies the greater portion of this space; but there is a channel both to the northward and southward of the bank, of which that to the northward, about 5 leagues broad, in its narrowest part, is the chief.

The narrow rocky islet, Lobos, mentioned above, with a cluster of rocks extending from it to the eastward, lies at the distance of 5 miles, S.E. $\frac{1}{4}$ E. (S.E. $\frac{1}{4}$ S.), from the eastern point of Maldonado, in latitude $35^{\circ} 1'$ S. At 18 leagues W. $\frac{1}{4}$ S. (W. $\frac{1}{4}$ N.) from Lobos, is another small isle, Flores, in latitude $34^{\circ} 56' 20''$ S., now rendered conspicuous by a lighthouse; it exhibits a brilliant light, with eclipses. It stands on the highest S.W. part of the isle, whereof the height above the level of the sea is 63 palms, or 45 feet. The height of the lantern is 75 palms, or 54 feet, so that the total height is 138 palms, or 99 English feet. To the westward of Flores, distant 16 miles, is the Port of Monte Video, on the western side of which, upon the summit of the mount, is another lighthouse, 478 feet above the sea.

On a S.W. line from Monte Video the river contracts its breadth to that of 56 miles, where Ponta de Piedras, or Rocky Point, presents its face to the east. At 4 leagues higher, in latitude $35^{\circ} 16'$ S., longitude $57^{\circ} 6'$ W., is Point Indio, distinguished by trees; and at about 22 miles above, or to the north-westward of this, is the village of Magdalena, with several Estancias, or cattle farms. Ten miles above Magdalena is the Atalaya Church; and, at $4\frac{1}{2}$ leagues higher is Point S. Iago and the Ensenada, or Careening Place, of Barrogan, which are 9 leagues below Buenos Ayres. On all the coast between Point Piedras and Point S. Iago the water is shoal to a considerable distance from shore, with 3 to 2 fathoms, hard ground.

Extensive banks, named the Ortiz (or Orthes) and Chico, occupy a great portion of the central part of the river, north-westward of Point Piedras; and they form three channels, of which the deepest is the middle one, between the Ortiz and Chico. The general depths in this are from $3\frac{1}{2}$ to 4, 5, and sometimes to 6 fathoms. In the southern channel, between the Chico and shore, the depths are $3\frac{1}{2}$ and 3 fathoms; and in the northern they are only 3 and $2\frac{1}{2}$ fathoms.

Captain Barral goes on to say:—

"The Rio de la Plata is supplied from the west by the waters of the Uruguay and Parana, two great rivers, which themselves receive the waters of a great number of subsidiary streams.

Three towns of the republic of Uruguay stand on the north side of the river: the first, in coming from Cape Santa Maria, is Maldonado, already described; the second, Monte Video; and the third, Colonia del Sacramento. The chief, or capital, is the city of S. Felipe, or Monte Video.

BUENOS AYRES, the only town on the south side of the river is the capital of the United Provinces of La Plata. Its distance from the River Parana is 5 leagues. From Cape Sta. Maria to Maldonado the distance is 16 leagues; from Maldonado to Monte Video, 21 leagues; and from the last to Colonia, 31 leagues; from Cape S. Antonio to Buenos Ayres the distance is 45 leagues.

Near the north shore are several isles, and a number of rocks both above and under water. These isles are Lobos, 8 miles to the south-eastward of Maldonado; Gorriti, in the Bay of Maldonado; Flores, having the lighthouse before noticed, 15 miles to the eastward of Monte Video; the Islets of San Gabriel, Farallon, and Lopez, before Colonia; and those of Hornos, at a league and a half to the N.W. from that town. The rocks are all within a short distance from the land.

Winds.—At the entrance of the river, and at Monte Video, the most prevalent winds are the N.E. and the S.W. At Buenos Ayres, and at La Colonia, the prevailing winds are from N.N.W., S.E., and S.W. During summer, when the weather is fine, the winds blow over all the river, pretty regularly, from the E. to S.E., after six in the morning to sunset. In the night the winds vary to the North.

S.W. and S.S.W. winds are known in the Plata under the denomination of Pamperos, as coming from the Pampas, or Plains, over which they pass. They clear the sky, and commonly blow after rain, or when the wind has varied from the N. to N.W., and to W.; and, in the summer, after a calm and very hot day. Sometimes the Pampero comes on after a strong N.E. wind, while the sun is obscured by clouds; when its gust is sudden and very dangerous. It thus meets the ships which are found in the Plata, or near the entrance, and is indicated by a sudden fall in the barometer, which rises afterward.

As it rains more frequently in the winter than in the summer, this wind is more common in the rough season, and then lasts for two or three days. In summer it grows stronger, but generally ceases sooner. It is then designated in the country Turbonado, equivalent to the French word *Tourmente*, and to the English Storm.

When the weather is fine, and the wind light and constant, the tides are regular on the shores; but when there is any perturbation in the direction and force of the winds, the tides become irregular, and form currents, which frequently acquire a velocity of 4 and 5 miles an hour.

At Buenos Ayres the sea is high with winds from S.E., and low with winds from N.W. and S.W. At Monte Video, and on the rest of the north shore, the waters rise with S.E. and S.W. winds, and fall with northerly ones. The differences of level on the two shores rarely exceeds 4 or 5 feet, but in strong N.W. gales, the rise is, at times, 10 feet.

In the months of March, April, and a part of May, the river is higher than in the other months of the year, being raised by the increase of the waters of the Parana and Uruguay, which bring down, at that time, trees and bushes from the verdant islets of the river. This is the finest season of this part of

South America, with the winds moderate and temperature agreeable. During the spring, summer, and winter, the winds are almost constantly strong, and the temperature of the air very agreeable.

Anchorage.—Whenever the lead indicates oaze or muddy ground you may drop an anchor, only taking care to be at a sufficient distance from the bank, and so as not to drive upward. With the winds in the southern quarter, the anchorages on the south side are the best; but with northerly winds the opposite side is to be preferred.

Ships of war and large frigates may ascend to Monte Video; all ships drawing 16 or 17 feet water may safely proceed to Buenos Ayres on the one side, and to the Hornos Islets on the other. The anchorages sheltered from N.W., N.E., East, and S.E. winds, are Maldonado, Monte Viedo, and Hornos. Those sheltered from the S.W. are the Ensenada de Barragan and Buenos Ayres.

Small ships may also anchor at the entrance of the River of Santa Lucia, and at Colonia on the north coast; at the Rio Salado in the Ensenada de San Boromber, and at Riachuelo near Buenos Ayres on the south side.

You may anchor at Maldonado in 6 or 7 fathoms of water; at Monte Video, in the road in 5 fathoms, in the harbour in 3 or $3\frac{1}{2}$; at the Isles Hornos in $3\frac{1}{2}$ or 4 fathoms; in the road of the Ensenada de S. Borombon in 4 fathoms; near Buenos Ayres, in the road in $3\frac{1}{2}$ or 4 fathoms; and near the town in 2 and $2\frac{1}{2}$ fathoms.

In the anchorages of the north coast you ought to moor during S.W. winds, and in the others with the winds south-easterly. Of all the ports and roads the best holding-ground is at Maldonado; this is oaze covered with sand. Elsewhere the bottom is of soft mud, on which the anchors drag in gales of wind. During the Pamperos, the Isles de Hornos present very good anchorage, the sea before them being broken by the Bank of Palmos.

Depths of the River at the Entrance, and in the Offing.—When you have gained the parallel of Cape Santa Maria, and longitude $51^{\circ} 54'$ W., the depth, at the distance of 33 leagues from the cape, is 80 fathoms, bottom of oaze; at 25 leagues the bottom is of sand, or if oaze mixed with shells, and the depths only 35 to 25 fathoms; on advancing nearer to the cape, the decrease in depth is irregular. On the parallel of Castillos, $34^{\circ} 24\frac{1}{2}'$, at 33 leagues off, the depth of water is 52 fathoms, and the predominating quality of the bottom is of sand. In navigating on the parallel more to the South, or that of Cape Santa Maria, less water will be found in the same longitude, and the depths gradually diminish.

At 15 leagues from Cape St. Antonio is a depth of 15 fathoms, sand; at 28 leagues from the same cape, to the S.E., are 40 fathoms, similar bottom. To the north of the cape, at 5 leagues from the land, are 6 and 7 fathoms; and in the direction of the English Bank, on the parallel of $35^{\circ} 11'$, are 5 and 6 fathoms, with sandy bottom; at 5 leagues without the same, near the meridian of $55^{\circ} 35'$.

When turning in, on the parallel of $35^{\circ} 20'$, and having attained the same meridian, the bottom has been found of fine sand, the lead indicating about 7 fathoms of water. On the parallel of $35^{\circ} 35'$, and thence to Cape S. Antonio, the bottom is of sand, mixed with shells or gravel.

From the latitude of $35^{\circ} 20'$ S., having passed the meridian of the English Bank, the depth does not increase to more than 7 fathoms. On the parallel of 36° it attains 10 and 11 fathoms. To the west of the bank, on this parallel, are 5 and $5\frac{1}{2}$ fathoms only. At 20 leagues off, from the entrance of the Rio

de la Plata, the water loses its blue colour, and assumes that of green tinged with yellow.

On running for the north shore, when in view of or near the land, the quality of the bottom will be oaze. When running on a parallel a little higher than that of the Isle of Lobos, on the north of this isle, oaze will also be found; at 2 miles south of it are 14 and $14\frac{1}{2}$ fathoms of water; and at 6 miles, 20 and 21 fathoms. From Lobos westward, toward Monte Video, the depths of water diminish gradually, but irregularly. In the passes, formed by the banks of hard sand, situate between Monte Video and Buenos Ayres, are $3\frac{1}{2}$ to 5 fathoms of water."

Navigation of the Entrance and in the River.—The preceding description indicates the precaution requisite to be taken on approaching the different points of the entrance. On advancing, it is prudent to prefer the north coast, that only being elevated.

Some navigators have pretended that they can always judge of their position without a view of the land, by the depths of the sea, and an inspection of the divers qualities of ground gained by the lead: but this must be incorrect; for, in exploring the offing on all these coasts, soundings were frequently found similar to those off the river, and the resemblance, if depended on, may cause dangerous errors. We therefore advise mariners not to attempt making the river without being previously well assured of their position by observation of latitude and longitude, and always to advance with precaution, on account of the currents which may happen to prevail between the hours of observation.

If the wind be steady from N.E., when you approach Cape Santa Maria, that will be an advantage which will allow you to reconnoitre a greater extent of coast before entering the river; but, under other circumstances, a sight of Lobos is, in the first instance, to be preferred; as you may thus avoid being wind-bound on the north coast, and have a better chance of plying to windward. It has been already noticed that the landfall of Cape Antonio is both difficult to make out and dangerous to approach, unless in favourable weather.

Having arrived to the southward of the Isle Lobos, at the distance of 2 or 3 miles, the direct course for the Isle and Lighthouse of Flores will be N. 78° W. (*true*), or W. $\frac{1}{4}$ S. by compass: but, as the Plata is subject to very variable currents, such must be allowed for on approaching the north shore, taking care, at the same time, not to fall too far to the southward or toward the English Bank. On approaching land, you may, in good time, see the round Tower of Maldonado and the high lands to the westward; and in continuing the route, at the distance of 5 or 6 miles off, distinguish a point formed of black rocks, with beaches of sand to the right and left of it. This point, named Punta Negra (Black Point), is situate at 14 miles westward of Maldonado; it is the western point of a great sandy bay, over which the high lands are remarkable, as appearing to rise, like a great white border, from the shore of Maldonado and the extreme points of the Bay, Ballena, and Negra.

When you are on the meridian of Punta Negra, at the distance of 6 miles, the Isle of Flores will again bear N. 70° W. (*true*), or W. $\frac{1}{4}$ S. by compass. Here you will have 11 or 12 fathoms of water, oazy bottom, and may thence proceed with perfect safety.

Beyond the lands situate to the north of Punta Negra, the coast makes a break or aperture, and thence becomes very low. On steering in sight of *land*, you may now distinguish the Hills of Aflar, situate in latitude 34°

47' 15" S., and longitude 55° 26' 15" W.; when these bear N. by W. (by compass), and the nearest hill of Punta Negra bears N.E., you will be 27 miles eastward of Flores, in 11 or 12 fathoms of water, oazy bottom, and the isle in a line with Lobos. The Hills of Afilar are insulated and resemble two mamelons, or tetas, or paps.

On proceeding upon a course W. $\frac{1}{4}$ S., as above, you may see, from the mast-head, the light-tower on Flores, at the distance of about 12 miles. This isle, when first described, resembles three islets; afterward the lower part gradually rises from the horizon, and at 5 miles off the whole comes in sight. When the sea is high, the isle, when first seen, appears in two portions only.

On coming in by night, you may see the revolving light on Flores, directly ahead, and may approach it to the distance of 4 miles; then passing it to the southward at 2 or 3 miles. Between Flores and the English Bank the bottom is of oaze, and the general depth 6 and 7 fathoms. The distance between is 10 miles.

From the Isle Flores to the harbour of Monte Video the distance, in a right line, is 16 miles, W. by S., which will lead clear of the Punta Brava, 4 miles to the eastward of that port. This Punta Brava is formed by a line of rocks projecting into the sea. One shoal, detached from the rest, requires a berth on passing. A large white house stands to the north of the point, and a smaller one is situate toward the middle of the rocks.

On leaving Flores, when the weather is clear, the Cerro or Hill of Monte Video comes in sight; and in some time after the steeples or towers of the cathedral in the city will be seen.

With the wind from the N. or the N.E., you may steer by night to the W. by S for doubling Point Brava; but with the winds from the S.E. or E.S.E., it will be prudent to steer W.S.W. You ought, in precaution, either in one case or the other, to keep the light on Flores E. by N. or E.N.E., with an assurance that the currents will not set the ship in the direction of Point Brava.

When the Cerro or Hill named Monte Video bears N.W., the point will be doubled, and you may proceed on the starboard tack, so as to gain the anchorage. A large vessel, after passing Brava, may proceed W. by S., and find anchorage in the Great Road in 5 fathoms. At a mile to the south of Point Brava are 5 fathoms of water.

In the track from Lobos to Monte Video, as in all those in the interior of the river, the rate of way must be measured by the log, and the current by a boat, in the usual manner, so as to ascertain whether it be in favour of the ship or otherwise. The route will be modified accordingly.

As all the coast between Punta Negra and Flores may be approached to the distance of 5 or 6 miles, it is best by night to make the tacks on the starboard side. The revolving light on Flores will, in this case, be clearly seen; and you may pass to the southward of it, leaving it at the distance of 4 or 5 miles, which will lead, at a sufficient distance from the English Bank, in 6 and 7 fathoms.

The Cerro or Hill of Monte Video is 478 feet high above the level of the sea. On it is established a fixed light, but which cannot be seen by night more than 5 or 6 miles off, when the weather is clear.

Should you attempt to make Monte Video, by passing to the southward of the English Bank, you must pass this shoal, from the entrance of the river, on the parallel of 35° 30', steering W. by S. with northerly winds, and W.S.W. with the wind southerly.

On passing over the Great Bank the soundings will be fine sand, then

ordinary sand, afterward oazy sand, and lastly oaze, when over the bank, and on the meridian of Monte Video. You will then, by steering North, gain sight of the mountain, which may be seen by day, in clear weather, 9 leagues off. Its position is latitude $34^{\circ} 53' 2''$ S., in longitude $56^{\circ} 11' 37''$ W.

If, notwithstanding the precautions indicated, you fall on a bottom of 5 fathoms, in passing to the southward of the English Bank, by tacking to the N.W. you will soon after gain from 6 to 8 fathoms. In thick weather, or if the true situation of the ship be uncertain, in any part of the river you may always anchor rather than continue your route.

MONTE VIDEO.—The Bay of Monte Video is $2\frac{1}{2}$ miles in extent, and its general depths are from 15 to 9 feet of water. The city, named that of San Felipe, or St. Philip, is on the eastern side, as shown on the particular plan of the harbour, and stands on a peninsula; it is strongly fortified, and has a citadel on the East. This place is the capital of the Republic of Uruguay, formerly named the Banda Oriental. The population is estimated at about 10,000. A British consul is resident here. The anchoring-ground is good, but exposed to the Pamperos, or S.W. winds, which at times raise the water 6 or 7 feet above the ordinary level. On the western side is the hill from which the harbour derives its name, and on which stands the lighthouse; the other part of the coast is low.

The best anchorage has been already described, and therefore we have only to add that there is a shoal in the eastern part of the bay, named El Bajo de la Familia, and lying at nine-tenths of a mile N. by E. from the extremity of the eastern point, named that of San Jose, about which, likewise, there are several rocks. The depths between are from 15 to 9 feet.

SECTION V.

THE COASTS OF LA PLATA AND PATAGONIA,

FROM

THE RIVER PLATE TO CAPE HORN.*

The country between the River Plate and Rio Negro is termed the Pampas or Plains of Buenos Ayres, it is one immense plain covered principally with grass and clover, which feed a large number of horned cattle and wild horses. Captain Fitzroy says of this district: "As pasture land it is excellent, except in the summer, when all is parched. There is a rich tract of country between Buenos Ayres and Cape Corrientes, where the soil is rich and the water plentiful. In that tract there are ranges of low hills, extending nearly east and west. All this country is exposed to severe cold in winter, and excessive heat in summer; great and sudden changes in the temperature take place after very hot weather, cold winds rush northward with the fury of a hurricane. Even the wandering Indians avoid this region, and cross it only to get salt, or visit their burying places." The Spaniards name the maritime part El Pay del Diablo, or the Devil's Country; yet the coast, which is entirely flat

* This section is principally derived from the valuable work on Patagonia, by Captains Fitzroy and King, R.N.

and destitute of harbours, may, for the most part, be approached with safety, as the soundings are regular. The southern shore of the entrance to the River Plate is of an entirely different character to the northern, being without hill, rock, or even a stone. The land is so very low that in Sanborombon Bay, between Point Piedras and Cape San Antonio, it is difficult to determine the boundary line between land and water. The rise, even of a foot, in the height of the water, makes a change of some cables' lengths in the depth of the bay. The soundings are very gradual, and the bottom principally of fine sand and clay, with occasional patches of oaze and a kind of hardened earth, of a dark brown colour, named *tosca*, which in some places is found in lumps almost as hard as stone, while in others it is of the texture of a sound old cheese; this is almost as injurious to the bottom of a ship as rock itself. In many places the bottom is soft, often extremely deep mud, yet on account of the hard lumps of *tosca*, and the character of the coast, it is very dangerous for a vessel to approach this shore.

From the River Plate to Blanco Bay the coast trends South and West about 300 miles, and is generally low and uninteresting, affording no shelter whatever. Along the coast margin are hills of the elevation of 70 to 100 feet, and behind these are plains.

Off the most projecting points there are shoals which must be cautiously avoided. From Blanco Bay to the River Negro the coast is dangerous; the land is everywhere low, the shoals numerous and extensive, and the tide strong. In Blanco Bay, the best harbour hereabout, the tide rises from 8 to 12 feet; this is the only known asylum for large ships; but good water is here extremely scarce, and wood is not obtainable, unless from a great distance.

Captain Morrell, in describing the coast to the southward of the river Colorado, says, "On the 20th of September, 1822, we were close in with the bay of All-Saints, in latitude $40^{\circ} 30'$ S., but did not stop to examine it, being anxious to enter Rio Negro on the following day. To the southward of Rio Colorado, or Red River, the coast is gemmed with islands, and abounds with shoals, extending a league to the eastward. Among these islands and shoals are many good and safe harbours, for vessels under 300 tons burthen.

RIO NEGRO.—About 12 leagues south and west of these islands is Rio Negro, in which we cast anchor on the 21st, our vessel being the first from the United States that ever entered this river. Previous to this visit of the *Wasp*, Rio Negro had been of very little note; but it is now much frequented, especially by whalers, who touch here for refreshments. Here we found bullocks, sheep, hogs, and poultry in abundance; and in the summer or winter (say from March to June) any quantity of vegetables and many different kinds of fruits may be had at this place on a brief notice, and at a very low rate. Good water can be drawn alongside at the last of the ebb, and wood in any quantity may be cut by the ship's crew close to the banks of the river. The inhabitants are principally Spaniards, who are very friendly to strangers, with whom they are anxious to open a trade.

In coming from the eastward for Rio Negro, the navigator should endeavour to make the land in about the parallel of $40^{\circ} 52'$ S., and longitude $62^{\circ} 15'$ W., when he will first see Point Rasa, which will be readily known by three remarkable hummocks. After approaching to within about one league of this point, he has to steer S.W. toward Rio Negro, taking care not to come into less than 6 or 8 fathoms of water, with sandy bottom. The shore is a continuation of low sand-hills, interspersed with heath and brush-wood, until you approach the river, where the hillocks become more elevated.

and are composed of clear white sand, lying in ridges or undulations like the waves of the ocean. About 4 or 5 miles south of Point Rasa is a singular hillock of brushwood, having small shrubs toward the east end, which, from the sea, appear like a drove of cattle. Eight miles to the south and west of this is a remarkable gap, about $2\frac{1}{4}$ miles back from the beach. As you approach the entrance of Rio Negro, the range of white sand-hills will terminate, and the mouth of the river, bearing W.S.W., appears high and bluff on the eastern side. The western point of the river is low, but rises gradually to the south barranca, which is high and bluff, terminating in a perpendicular point; and this point is a table land for 4 or 5 miles to the westward.

In entering Rio Negro, without a pilot, the S.E. channel is to be preferred, and you must keep along in 4, 5, or 6 fathoms of water, until you bring Point de Maine, the eastern point of the river, to bear N.W.; then steer for the mouth of the river, observing to keep Point Welcome, which is a remarkable bluff promontory, about 10 yards open of a low point off the pilot's house. These marks are distinctly seen when Point de Maine bears N.W.; but in entering beware of the flood tide, which sets strongly over the north bank; and, if your vessel draws more than 10 feet of water, you must not attempt to enter until three-quarters flood, when you will have from 2 to $2\frac{1}{4}$ fathoms of water, between the banks, which will deepen as you approach Point de Maine. The breakers on the bank are distinctly seen, and, with a southerly wind, it frequently breaks all about the channel. Having passed through between the north and south banks, you will find 4, 5, and 6 fathoms of water; but you must be careful and keep the eastern point on board until you are inside of the point of the Borrás, by which means you will clear the inner bank, extending two-thirds of its length outside the harbour's mouth.

In this river, at the town, are about two hours of flood tide, and commonly about ten hours of ebb, frequently running at the rate of 5 or 6 miles an hour. But within the mouth of the river the flood tide runs four hours, and the ebb eight hours, at the rate of 3 or $3\frac{1}{4}$ miles an hour. It is high water at the bar, on the days of new and full moon, at 11h. 15m., and the water there rises 11 feet on the spring tides, and 8 feet on the neaps; but when the wind blows strongly from the S.E., the tide rises from 12 to 14 feet. Along the coast is a regular tide of six hours flood and six hours ebb, but the flood tide inclines rather toward the shore, about N.E. by N., at the rate of 2 or 3 miles an hour. Consequently, in entering Rio Negro, particular attention must be paid to the currents and tides, which set strongly to the N.E., round the Point de Maine, or outer point."

ST. MATTHIAS BAY.—From Rio Negro the coast for nearly 30 leagues trends westerly, whence it sweeps south-easterly in a broad semi-circle, terminating in a peninsula which projects to the N.E., thus forming the extensive Bay of St. Matthias. On the western side of this bay, somewhat inland, rises the Mount of St. Antonio; and in the N.W. corner is a port of the same name, said to be a fine harbour, and very convenient for whaling ships, though but little frequented; its entrance is very narrow, between banks on either side. The S.E. part of the bay is formed by Valdes Peninsula, within which, on the N.W., is Port San José; and, on the S.W. side of the peninsula, is the Bahia Nueva, or New Bay; the neck of the peninsula extending between them. On the eastern side of the peninsula is Port Valdes, in latitude $42^{\circ} 30' S$.

BAHIA NUEVA, OR NEW BAY, is an excellent place for ships in want of refreshments, which may readily be obtained. Whale ships having good ground *tackling* may lie in any part of the bay in perfect safety. The best anchorage

is on the west side, in from 5 to 10 fathoms, at about a mile off shore, as in this part easterly winds seldom, if ever, blow with sufficient violence to injure any ship lying with an anchor ahead. On the 25th of September, 1822, Captain Morrell, in the *Wasp*, anchored on the south side of this bay, in 5 fathoms, about 3 miles within the Punta Ninfas, or South Point. On landing, grey foxes, brown hares, and mountain deer in great numbers were seen. Several cow-whales, of a large size, were at the same time in the bay, and perfectly tame. On the next day, upon landing on the north side of the bay, on the plains of the peninsula, about 3000 wild bullocks were seen, of which four of the finest were taken. At the head of the bay were found vast forests of heavy timber, some of which would make fine spars for ships of any size; being a kind of bastard cedar, which is very tough, and when dry becomes extremely light. There were, also, many fine springs of excellent water, and numerous birds of beautiful plumage. The waters abound with scale-fish of almost every variety.

PORT SANTA ELENA is a small bay quite open to the south; and near the middle of the entrance, which is only a mile and three-quarters wide, is a small shoal of 12 feet; and at 2 cables East (*true*) from it is a low islet, named Florido. The best passage in is to the W. and N.W. of these, where there will be found 10 to 7 and 6 fathoms of water, in the N.W. cove of the harbour. The bay affords good shelter from S. by E. westward to E. by S.; and, as the heavy and prevailing winds are between these points, this place may well be recommended to stop at for a few days. The winds are seldom from S.E., and generally light; and, the tide running strong across the entrance of the bay, the sea, during strong S.E. winds, is much cut off.

Captain King says:—"This harbour may be easily known by some hummocky hills on the N.E. projecting point, upon the easternmost of which is a remarkable stone that appears to have been placed there as a monumental record, but which is a natural production. The best anchorage is at the N.W. corner of the bay, in 6 or 7 fathoms, but not too near the shore; for when the sea is heavy the ground-swell breaks to some distance off. In working into the bay, the two-fathom bank must be avoided, for which Florido Islet is a good mark.

The water that is contained in the two wells on the N.W. side of the harbour is too brackish to be worth consideration, nor is there any fresh water to be obtained from any part of the harbour. Of fuel a temporary supply may be procured from the small shrubby tree, bearing a yellow flower, with a prickly at the extremity of every leaf; the sealers call it *piccolo*, from the small dimensions of its stem: it is tolerably abundant here. Guanacoës, ostriches, armadilloes, and the cavia, or Patagonian hare, are to be procured, as are, also, wild ducks, partridges, snipes, and rails; but fish seem to be scarce. The Indians sometimes visit this part of the coast, which is used by them principally for burying their dead.

In approaching Port St. Elena, from the northward, there are several rocks near the shore which are very little above the water, and there is a considerable reef in the offing, situated at $4\frac{1}{2}$ miles, S. 78° E., from Cape Raso, and N. 51° E., 8 miles, from the N.E. trend of the north head of the port. It is a dry rock, and is near the extremity of a ridge which, probably, projects off from the latter point, for there are two dry rocks in the same line of bearing, one a mile and a half, and the other three and one-third from the point, besides several patches which break. The tide sets rather strong along the shore, which is fronted by reefs for 2 or 3 miles off; great caution should therefore be used in approaching the coast, as the water is deep, and, if be-

calmed, it may be necessary to anchor, which will be in at least 80 fathoms water.

Should the above reef be as continuous as it appears, there should be good riding in Cruz Bay between Cape Raso and Port St. Elena. Between the south head of Port St. Elena and Cape Two Bays are two bights in the coast, the southernmost of which is considerable, and may probably afford a good anchorage.

CAPE TWO BAYS is a rounded point; a hill close to the sea, on the most projecting part of the cape, being in latitude $44^{\circ} 58'$ S.; the small islet of Arcé, to the S.E., is in latitude $45^{\circ} 0' 50''$ S., and longitude $65^{\circ} 25' 25''$ W.; and Rasa Islet is in latitude $45^{\circ} 6' 30''$ S., longitude $65^{\circ} 20' 11''$ W. From Cape Two Bays the coast trends westerly round Cape Two Bays, and forms the northern part of St. George's Bay."

Captain Morrell says:—"Cape Two Bays, as its name imports, is a projecting point between two bays, forming the south part of Camarones Bay, and the north part of the great Bay of St. George. About the shores of the last named bay are numerous rocks and isles, containing seals of both kinds, and behind some of which vessels may anchor in safety. Puerto de Melo, or Port Melo, in latitude $45^{\circ} 3'$ S., longitude $66^{\circ} 56'$ W., is the first safe harbour to be found after entering St. George's Bay on the north side. It is fronted by the Escobar and Leguma Islets, and ships of any size may lie within it, in perfect safety, in from 7 to 5 fathoms, sandy bottom. The entering passage is between the Escobar Islets and the eastern point, Punta de Portugal: at about a mile within this point the water has a depth of 5 or 6 fathoms. In this snug and safe harbour, at the head of the bay, vessels may obtain good fresh water, but wood cannot be obtained without difficulty. The tide rises about 18 feet; high water, full and change at 4h. 22m. Port Malaspina, in or about latitude $45^{\circ} 12'$ S., longitude $66^{\circ} 39'$ W., is fronted by the Viana Islets or Rocks, behind which vessels may find shelter from every wind, the S.E. excepted. In approaching this small bay, you will see the Tetas or Paps of Pineda to the north, abreast of which you may anchor in from 10 to 6 fathoms of water, fine sandy ground.

There are many other good anchoring places between this and Cape Blanco, the southern extremity of St. George's Bay, which require no particular directions, as the coast is bold and clear of danger, within half a mile of the shore. Easterly winds never blow here with any degree of violence; so that whalemén may cruise about these shores, in the calving season, with the greatest safety."

CAPE THREE POINTS.—The southern limit of St. George's Bay, Cape Three Points, is very easily discovered at sea by its very level outline, being a long range of table land higher than any part near it, and visible from the deck for more than 20 miles; and to the S.E., detached, but near the range, there is a conical hill, which is easily discerned from the northward, but from the N.E. is not seen, being concealed by the ranges of land behind it in the S.W.

CAPE BLANCO.—At $6\frac{1}{2}$ miles to the south of Cape Three Points is Cape Blanco, a low rugged tongue of land, terminated by a rounded but very rugged hillock, and two smaller ones; which, when first seen, appear to be islands detached from the coast. The neck of land which forms the communication with the coast is low and sandy, and probably offers, on its south side, shelter from southerly winds. There are several shoals off this part of the coast, that at low water would doubtless be dangerous. H.M.S. Adventure passed over two of these, and had not less than 5 fathoms, but probably at low water

the depth may be considerably less ; they are thrown up by the force of the tide, which sweeps round the cape, into and out of St. George's Bay, with great strength.

The north and south ends of the northern shoal bear, respectively, from Cape Three Points and Cape Blanco, E.N.E. $\frac{1}{4}$ E. (East), distant from the former 7 miles, and from the latter 5 miles ; consequently, it extends in a N. 31° W. (N. by W and S. by E.) direction for $5\frac{1}{4}$ miles ; it is scarcely a quarter of a mile wide. The north end of the southern shoal bears E. 5° N. (S. 75° E.) 7 miles from Cape Blanco, and extends in nearly a South (*true*) direction for 2 miles. Between these shoals there is a passage 2 miles wide, and the depth gradually increases to more than 15 fathoms.

Within the outer shoals are two others, imperfectly known ; and it is said there is much shoal ground to the N.E., for, in the year 1829, Captain King having approached the land, and being 14 miles from Cape Three Points bearing S. 38° W. (magnetic) the depth rather suddenly decreased from 40 to 14 fathoms. pebbly bottom, so that the foul ground extends for 14 or 15 miles to the N.E. of the cape, the edge of the bank being about 8 or 13 miles within the soundings of 50 fathoms. On approaching, the quality of the bottom becomes irregular, and changes from oaze to sand, and the shoal patches are pebbly ; so that by attention to the soundings and nature of the bottom, these shoals may be easily avoided. A good mark to avoid them is not to approach so near to the cape as to see the rugged hillock of Cape Blanco, and to keep the high land of Cape Three Points, which is visible from the deck about 20 miles, on the horizon.

The flood, or northerly tide, ceased in the offing at 4h. 15m. after the moon's passage ; but in the neighbourhood of the cape, and among the shoals, the tides may be less regular ; they produce strong ripplings, which set with considerable strength.

Off the coast, between Cape Blanco and Port Desire, within the distance of 3 to 5 miles from the shore, there are several small patches of rock, which uncover at half-tide ; but beyond that belt the coast is free from any known danger, and may be approached, by sounding, in not less than 14 or 15 fathoms ; within that limit the ground is foul. To the northward of Port Desire the land is low, with a shingle beach, excepting for the first 3 miles, where it is high and cliffy. The north point of entrance of the bay is a steep bluff, which is remarkable in being the only point of that description along the coast to the northward. At 3 miles N. 28° E. (magnetic) from this bluff there is a ledge of rocks, Surrel's Ledge, a quarter of a mile without which the depth is 13 fathoms. The Tower or Steeple Rock becomes visible after passing this ledge ; it opens out when the north bluff bears S.W. $\frac{1}{4}$ W. A ship bound to Port Desire, or merely wishing to anchor in the bay which fronts it, may procure a good berth in $6\frac{1}{4}$ fathoms, at low water, well sheltered from N. $\frac{1}{4}$ W. to S. $\frac{1}{4}$ E., with the north bluff bearing N.W, $\frac{1}{4}$ W., the Tower Rock W. $\frac{1}{4}$ N., and Penguin Isle S.E. $\frac{1}{4}$ E.

This situation being a little to the southward of the fair-way of the port, and about $1\frac{1}{4}$ mile from the nearest shore, is quite out of the strength of the tide ; the bottom, being strewn with rounded stones, is rather foul for hemp cables, but the holding ground, although of suspicious quality, seemed to be good : at this place the tide rose from $6\frac{1}{4}$ to $9\frac{1}{4}$ fathoms, a difference of $16\frac{1}{2}$ feet.

PORT DESIRE.—The river of Port Desire has rather a difficult entrance, from the strength of the tide and its narrow width ; and it is rendered still more confined from several rocky reefs that extend off the north shore to nearly mid-channel. There is good anchorage off the mouth. By waiting, therefore,

for low water, all the dangers that exist will be seen, and the vessel easily dropt in with the tide, should the wind be, as is it generally is, westerly. If it be fair, it is advisable for the ship to be in the entrance at slack water; or, if the breeze be strong enough, a little before. As the water is deep on the south shore, there seems to be no real danger that may not be avoided by a careful look-out for kelp, which always grows upon, and therefore plainly indicates the existence of rocky ground. The course is about W.S.W. $\frac{1}{4}$ W., and the distance from the entrance to the anchorage is $1\frac{1}{4}$ mile. The anchorage is off the ruins* on the north shore, and the vessel should be moored. The tide sets in and out regularly.

The river was examined for 16 miles, but is probably navigable to a much greater distance. Four miles above the ruins there is a small peninsula, connected by a narrow isthmus to the north shore. By sending a party up, and stationing men with guns on the isthmus, it is very likely that several guanacoos may be shot as they are driven across it; for the peninsula is their favourite place to feed upon. These animals are very abundant, but unless stratagem be used, they are very difficult, from their shyness, to be approached. There are some water holes near the ruins, which generally contain water, but of so brackish a quality as scarcely to be worth notice. The wood is of the same kind as that found at Port Santa Elena; it burns well, and is much prized by the sealers for that quality.

Captain Morrell, in describing Port Desire, says:—"It is the seaport of a large river; the mouth is very narrow, and has many rocks and shoals about it. It continues to be narrow for about $2\frac{1}{2}$ miles from the entrance, when it expands into a broad basin, sprinkled with a number of small islands, frequented by seals. Near the mouth of this port, on the south side of its entrance, is a remarkable rock, rising from the water like a church steeple of Gothic order, and is known by the appropriate appellation of Steeple Rock. This rock forms a conspicuous landmark for mariners who are approaching the harbour, which would otherwise be difficult to find. There are two springs on the south side of the river, about 2 miles from the beach, or in a line S S.E. (true?) from Steeple Rock, from which water of a good quality can be obtained in abundance. The tides are very rapid about this part of the coast running at the rate of 8 miles an hour, nearly north and south, and rising 25 feet at each flood."

PENGUIN ISLAND.—The outer side of this little island is bold, and may be passed very close without danger, for the stream rather sets off than towards the shore. The tide is very rapid, and forms, even in a calm, strong ripplings, which, in a breeze, must be very dangerous for boats to pass through, and, indeed, not agreeable for vessels of any size. The flood sets to the northward, and, during its strength, at more than 3 knots; for the ebb was found to have set 15 miles to the south in 5 hours. Off the island the northerly stream ceases at 4h. or 4h. 15m. after the moon's passage, which is $3\frac{1}{4}$ or 4 hours, at least, after high water on the shore.

SEA BEAR BAY, according to Captain King, is one of the best anchorages on this coast, but is difficult of access without a leading and a fresh wind, on account of the strength of the tides, which set to the northward through the narrow channels separating the rocky islets that are strewed between Penguin Island and the main land: The bottom, besides, is not only deep, 23

* Some years since a Spanish colony was founded at Port Desire, but, not answering the purpose, it was soon afterwards given up. The ruins of the edifices, which are of stone, and the remains of a fruit garden, that at our visit produced quinces and cherries, distinctly point out the spot.—*Captain King.*

to 30 fathoms, but is very foul and rocky; and although a ship may be prevented from drifting through by dropping an anchor, yet its loss, from the foulness of the ground, would be almost certain. In entering the bay, border pretty closely to the low rocky point to the southward, to avoid a reef that lies about a quarter of a mile without it; but as the sea always breaks upon it, the eye and a due consideration of the tide are the best guides. This reef extends for some distance to the eastward of the breakers, and therefore the tide, when within it, sets in or out of the bay, but with little strength. Should a ship not be able to enter the bay, there is anchorage off the point, between it and the reef, on tolerably clean ground. You will have 12 or 13 fathoms, off the reef, then the depth shoals for one or two heaves to 7 fathoms, after which it deepens again; you may then haul across the bay, and anchor at about a quarter of a mile within the low rocky point, bearing E. $\frac{1}{4}$ N. or E. by N., by compass, in 4 fathoms low water, avoiding the kelp which projects off from the sandy beaches. A small vessel may easily turn in, but you should hesitate taking such a step in one that you could not make quite certain of. When once in the anchorage is good, and protected at all points, except between N. 41° and N. $78\frac{1}{4}^{\circ}$ E., but from the appearance of the beaches it is not probable that a heavy sea is ever thrown into it.

There is no wood to be procured of any size, and the few gallons of water that are collected in the wells at the point, so very precarious as to be scarcely worth attention. The passage to the watering-holes is over a small rocky bar, which a boat may cross at three-quarters flood: it is immediately within the eastern point of the bay: there is a small spring at the north end of the third sandy beach, which a herd of guanacoes was observed to visit every morning; but as the water only trickles down in a very small quantity, it cannot afford more than a temporary supply. Two of the three wells at the point we found to be full of sea-water, which had made its way over the rocks; the other contained about 40 gallons of rather a brackish taste. Besides a good and secure anchorage this place affords no other advantage; but it is convenient for sealing vessels to anchor in whilst employed in their occupation upon Penguin Island. Sea Bear Bay is in latitude $47^{\circ} 56' 49''$ S. and longitude $65^{\circ} 41\frac{1}{4}'$ W., variation 20° . High water, full and change, at 12h. 45m., and the tide rises 20 feet.

FERRER, OR SPYRING BAY, is contained between the south head of Sea Bear Bay and a point of land within Ferrer Isl t, or the Shag Rock; it forms a considerable bight, but is much exposed, being quite open to the south and east; and at the conclusion of a S.W. gale, when the wind always veers to S. and S. by E., there is a considerable sea. The shore is skirted for some distance off with many rocks, and the bay, altogether, is quite unfit for anchorage. The land is of the same height as about Sea Bear Bay, but has more lumps or nobules of rocky hills visible on the outline of its summit.

A rock has lately been discovered (March 10th, 1849,) off the entrance to Spyring Bay, by M. J. Williams, of the Sirius, who, in a letter to his owners, stated:—"We arrived on this coast on the 10th of March, and the same evening had the misfortune to run on a reef not laid down on Fitzroy's charts, who, with the officers of H.M.S. Beagle, and others, were surveying this coast from 1828 to 1834, and, as they could not find it, they erased it from the charts. I have gone over the same ground four different times, but never found anything like a reef before. The position is about lat. $48^{\circ} 7'$ S. and long. $65^{\circ} 37'$ W., at about 9 miles off Spyring Bay. After striking about 20 minutes, by laying all a-back, hauling lee-tacks forward, and weather-sheets aft, she came off into 4 or 5 fathoms; but, before we could get com-

manding way on her, she struck on her port bilge. At the same time we had 7 fathoms water under the starboard fore-channels. In about 5 minutes we got clear off, fortunately without damaging our rudder, but found the ship making a great deal of water," &c., &c.

The Ferrer, or Shag Rock, is a whitish mass, perfectly bare, lying about $1\frac{1}{4}$ mile off shore; at 2 miles to the S.S.E. of it are four small dark coloured rocks; and at 3 miles South from it there is a large rocky islet. On the land, and at a short distance from the coast, are 3 hills, which appear, when a little to the southward of Sea Bear Bay, like three round-topped hills, but on coming more to the southward they appear to extend in length, and form into two hills; and at 3 leagues to the southward of the Shag Rock, they appear to form one mass of table land.

WATCHMAN'S CAPE is very low, and may be distinguished by its bell-shaped mount; at 2 leagues from the point is a shoal with kelp upon it, on which the least water is 3 fathoms, but on approaching it the depth gradually decreases: there are also many other shoal patches, but all are covered with sea-weed; the Adventure passed between several in 7 and 9 fathoms. The ground is very foul and uneven for more than 4 miles from Watchman's Cape; here the coast trends round to the westward, and becomes higher.

The BELLACO ROCK, or San Estevan's (Stephen's) Shoal, which was discovered by the Nodales in 1619, was searched for in vain in the Descubierta and Atrevida's voyage; but Captain Stokes, in the early part of 1828, on his voyage down the coast, found it, and had an observation of the sun close to it for the latitude: it is in latitude $48^{\circ} 30' 50''$ S., and longitude $66^{\circ} 9' 25''$ W. It bears S.E. by S., $10\frac{1}{4}$ miles, from the extremity of Watchman's Cape, and S.E. from Monte Video. The rock appears like a dark mass, about 9 or 10 feet above the water at high tide, and has the appearance of a boat turned bottom up; within half a mile of its south side the Beagle sounded in 12 and 15 fathoms, rocky bottom; but on its east side, at the same distance, the depth is from 20 to 24 fathoms. The ground around it being foul and uneven, the coast and its neighbourhood should be avoided. Between Watchman's Cape and Port St. Julian the land is of moderate height.

The whole of the coast between Cape Blanco and Port St. Julian is much strewn with shoals, which are the more dangerous from the strength of the tides which set between them. In navigating upon this part of the coast, the depth and quality of the soundings is a good guide; and, as a general rule, when the depth is more than 40 fathoms, there exists no known danger. By night, in particular, regard should be paid to the tide, which sets with considerable strength, the current running parallel with the shore.

PORT ST. JULIAN.—Wood's Mount, in latitude $49^{\circ} 14'$ S., and longitude $67^{\circ} 44'$ W., is visible from the deck for at least 11 leagues, and is a good mark for Port St. Julian, being flat-topped and much more elevated than the land about it; the trend of the coast may also be a good mark; but, as the land about Port St. Julian is higher than to the southward or northward, and Wood's Mount is so remarkable a feature, no mistake can be made; in a line with the south point of entrance the Mount bears W. $16\frac{1}{4}^{\circ}$ S. (N. $86\frac{1}{4}^{\circ}$ W.) The north head, Cape Curioso, is a low point jutting out to the northward, formed of cliffs horizontally stratified, of which the upper part is whited-brown, and the lower generally black, or with black streaks. Keeping Wood's Mount bearing S. 67° W. will lead you to the south head, which will be easily distinguished when at the distance of 6 or 8 miles or more, according to the state of the weather.

Captain Morrell has said, "It is somewhat difficult to find the entrance to

Port St. Julian, on account of its southern or outer point projecting past the northern point, so as to conceal the opening. It may be known, however, by a large white cliff, stretching along-shore from the south almost to the mouth of the harbour. No trees are to be seen, but there are some dark bushes on the sides of the hills. The bar, at the entrance of the port, sometimes shifts and changes its position; previous to attempting an entrance, therefore, I would recommend sending in a boat to sound. In entering the harbour the course is about S. $\frac{1}{4}$ W., and the water sufficiently deep when you are once over the bar, on which will be found, in the channel, about 4 fathoms at full sea: the tide rises about 20 feet. Both wood and water, in the winter, may be obtained, but with difficulty. A ship can lie in perfect safety from all winds. The natives seldom visit the port, except for the purpose of shipping."

The land to the southward of Port St. Julian is uniform, flat, and low; it is covered by scrubby bushes, and fronted by a shingle beach. At 10 or 12 miles south of it, coming from the E.S.E., a small flat-topped hill is seen over the low coast hills.

In latitude $49^{\circ} 27'$ S. the character of the coast changes entirely to a range of steep white clay cliffs, the average height of which was calculated, by angular measurement, to be about 300 or 330 feet. They rise like a wall from the sea, which, at high water, nearly washes the base; but, at low water, they are fronted by a considerable extent of beach, partly of shingle and partly of mud. Some short rocky ledges, which break at half-tide, lie off certain parts of this range, but none of the ledges extend for more than a mile from the shore. This cliffy range occasionally forms projections, but so slight as not to be perceived when passing abreast of them.

Anchorage along the coast may be taken up, with the wind off-shore, at from a mile to two miles from the beach, in from 9 to 12 and 14 fathoms, oazy bottom. In latitude $49^{\circ} 55'$ S. the range of steep white cliffs begins gradually to diminish in height, and terminates at 9 miles farther to the southward in a low point, Punta Rasa, forming the northern side of the entrance of Port Santa Cruz.

SANTA CRUZ.—The appearance of the coast about the entrance of the river of Santa Cruz is very remarkable, and easy to be known, from the manner in which it makes when seen from the northward, and is even more conspicuous when seen from the southward. From the latter direction a coast line of cliffs and downs, of considerable height, is seen extending to the southward of the entrance, as far as the eye can reach, and terminating abruptly to the northward in a high, steep, flat-topped cliff, Mount Entrance, of which the upper part descends vertically, the lower slopes off, and appears to be united with some very low land, which will be seen extending, (according to the distance off,) two or three points of the compass to the northward of it. Mount Entrance is at the south entrance of the river, and is, by angular measurement, 356 feet high; the low land is on the northern side of the entrance of the river.

The outer part of the bar, on which, at low tide, there are 14 feet water, is nearly 4 miles, E. $\frac{1}{4}$ S. (by compass), from Mount Entrance. Fourteen miles up the river, on the south bank, is Weddell's Bluff, a conspicuous headland; and eleven miles farther is another, named Beagle Bluff. Weddell's Bluff, open of the south entrance, (and in a line with the centre Sea Lion Island) bearing N.W. by W. $\frac{1}{4}$ W., is the leading mark for the passage over the bar; with this mark on, and at high water, the Beagle crossed the bar, in $7\frac{1}{2}$ fathoms. The Beagle Bluff, a little open of the low points of the north side of the river, is also a leading mark for crossing the bar.

After passing the bar, which is about a mile broad, there is no impediment to a free course up the river, keeping midway between the narrow points of entrance, until reaching the shoals which project off the east point of Sea Lion Island. The best anchorage seems to be to the south-eastward of Sea Lion Island, where the water is shoaler, and the tide not so strong.

The shore on the S.W. side is a range of clay cliffs, of the average height of 250 feet, with grassy downs, and intersected with valleys and ravines. On the eastern side, the land, for the most part, is low and level, with a shingle beach; the aspect of the country is dreary, the soil gravelly, and the vegetation scanty; the largest production of that nature being bushes bearing berries, none of which exceed 7 or 8 feet in height. Many brant geese and ducks were seen, as well as the common sea-fowl of these parts, such as penguins, cormorants, gulls, ducks, and divers, several ostriches also made their appearance on the beach, and traces of guanacoës were observed.

At an anchorage outside the bar, Mount Entrance bearing nearly W. by S., and Weddell's Bluff W. $\frac{1}{4}$ N., the Beagle rode out a gale from the S.S.W. and South, with a heavy sea without driving. The tides, in the offing, were observed to flow very regularly 6 hours each way, but to turn 2 hours later than the time of high water in-shore: the flood setting to the northward.

On the 24th January, 1824, Mr Weddell put into Santa Cruz, and from his observations we extract the following:—"The entrance cannot be seen at any great distance, as the land which lies behind covers it, but by the latitude it may be easily found. The shore on the left or south side is high, while that on the right is quite low. On the south side is a reef of rocks which show at low water; and on the north side is a shoal, almost dry at low water, which probably shifts. The leading mark into the river is a distant bluff,* which appears over the middle of the entrance, bearing N.W. by W. $\frac{1}{4}$ W. After passing the points of the entrance, two indentations will be seen, on the south shore, and in the second one is the best anchorage, in 5 fathoms, bottom of gravel and clay. All the north side of the river is shoal, and much of it dries at low water. The tide of flood, on the coast, runs to the northward, and, in strong southerly winds, continues to run two hours after the time of high water by the shore."

COY INLET.—Between Santa Cruz and this inlet the coast trends slightly in, and is formed by a succession of cliffs and intervening low beaches. Coy Inlet is conspicuous, as it is the only part of the coast that has the appearance of one between Santa Cruz and Cape Fairweather. When within 7 miles of its latitude, $50^{\circ} 57' S.$, as well to the northward as to the southward of it, a ship should keep at the distance of 4 or 5 miles off the coast. There can be no inducement to go nearer, as it affords neither fuel nor water; and if incautiously approached, much trouble and even danger may ensue from the ledges of rocks, which exist at 3 miles from the coast.

From COY INLET to CAPE FAIRWEATHER the coast is similar to the former part, but more free from rocky ledges; and good anchorage may be had from 2 to 6 miles off-shore, in from 7 to 12 and 14 fathoms, muddy bottom; the water shoaling gradually to the shore. The beach is of shingle to high-water mark, and then of hard clay as far as 100 feet beyond the low-water limit, where a green muddy bottom commences, and the water gradually deepens. The outer edge of the clay is bounded by a ledge of rocks, on which the sea breaks, it extends for some distance parallel with the coast.

Hereabout the flood sets to the N.W. by N., and the ebb S.E. by S., six

* Named by Captain King, Weddell's Bluff.

hours each way: high water at full and change between 9 and 10 o'clock, and the tide rises 24 feet. In latitude $51^{\circ} 16' S.$, about 17 miles North of the cape, there is a ravine containing abundance of fresh water, which may be obtained, when the wind is off-shore, without any difficulty; it is standing water, and, being much grown over with plants, may not keep, but, for a temporary supply, it seemed to be very good.

CAPE FAIRWEATHER is the south extremity of the long range of clay cliffs that extend from Coy Inlet, almost without a break. The cape resembles very much Cape St. Vincent on the coast of Spain; it also bears a very great resemblance to the Virgins' Cape to the southward, for which it has frequently been mistaken, notwithstanding there is more than 45 miles difference in the latitude of the two headlands. The cliffs are of clay, from 300 to 400 feet high, and are horizontally stratified, the strata extending for many miles without interruption. The interior is formed by open plains of undulating country, covered with grass and plants, among which is abundance of wild thyme, but entirely destitute of trees: it abounds with guanacoes, which may be procured by lying in wait for them at the water-holes. Besides the pond before mentioned, there is no want for fresh water, as it may be seen trickling down the face of the cliffs at short intervals.

RIVER GALLEGOS.—The entrance of this river is formed, on the north side, by the cliffy land of Cape Fairweather, and on the south by a low shore, that is not visible at sea for more than 4 or 5 leagues, excepting the hills in the interior, named the Friars, the Convents, and North Hill. The river is fronted by extensive sand-banks, most of which may be crossed at high water, but at half-ebb they are almost all dry. The entrance is round the south extremity of the shoals, which bear from the southern bend of the cape S.E. by E. $\frac{1}{4}$ E. ($S. 43\frac{1}{4}^{\circ} E.$) distant 10 miles. The passage in is parallel with the coast to the southward of the entrance, taking care not to open the land to the northward of Cape Fairweather's most easternmost bend, which, when in the fairway, should bear N. $40^{\circ} W.$ The shore on the port hand must then be gradually approached, and, in the present state of the knowledge we possess, the ship should be anchored to await low water, in 10 fathoms, at a mile and a half from the shore, so soon as the south point begins to be observed to trend round to the westward; the anchorage there is good, and well sheltered from the prevailing winds.

By anchoring thus, the passage in will be easily found, and may be passed before the shoals are again covered, which will be a good guide: four fathoms is the depth, at low water, in the narrowest part of the channel. Anchorage may be taken up on the south side, for to the northward the banks are extensive.

There is also a middle channel, and as it appears to be the widest, may be the best, for crossing the bar; but this was not completely examined, though, no doubt, there is a sufficient depth of water, at three-quarters flood, for any vessel to pass it. The southern channel, however, is preferable from having the land as a guide.

The river runs in to the westward for 80 miles, and then winds more southerly between two ranges of hills. Its banks are formed of downs, abounding with guanacoes and ostriches. The water is fresh at 25 miles from the mouth. In the entrance the time of high water, at full and change, is 8h. 50m.; the rise of tide, at the springs, is 46 feet, and the stream runs as much as 5 miles an hour.

From the south entrance of the Gallegos River, the coast towards the Virgins' Cape, extends in a south-easterly direction, and for the first half of the distance is so low and shelving that, at a few leagues from the shore, it is not

visible, so that a stranger may readily suppose it to be the entrance of the Strait of Magalhaens. There are, however, some marks by which it may be known, even should the latitude not have been ascertained. In clear weather, the Friars and the other hills near them, would be visible; and, in thick weather, the soundings off the cape will be an infallible guide, for, at the distance of 4 miles off, no more than 4 fathoms will be found, whereas, at that distance from the Virgins' Cape the depth is considerable; the bottom, also, to the northward of Cape Fairweather is of mud, whilst that to the north of the Virgins' Cape is of gravel, or coarse sand; and the latter cape has a long low point of shingle running off it, for nearly 5 miles to the S.W.; and, lastly, if the weather be clear, the distant land of Tierra del Fuego will be visible to the S.S.W.

At 18 miles to the southward of Cape Fairweather the cliffs again commence, and continue to the Virgins' Cape, with only one or two breaks, in one of which, 8 miles North of the latter cape, there may be landing for a boat. There is good anchorage, generally, all along the coast at from two to five miles off-shore; but the bottom is rather stony, and may injure hempen cables. As the cape is approached, the ground becomes more foul.

STRAIT OF MAGALHAEN, commonly named the *Straits of Magellan*, was discovered by Fernando Magalhaen, in 1520; its length, in a straight line, is above 200 miles, but, if the three great bends are taken into the account, it is rather more than 300 miles. It divides the continent of South America from the South American Archipelago, commonly named Tierra del Fuego. The eastern entrance is formed by Cape de las Virgines on the continent, and by Cape del Espiritu Santo, or Queen Catherine's Foreland, which is on King Charles's Southland, the largest of the islands composing Tierra del Fuego. At its western entrance are Cape Pillar on the south, on the Island of South Desolation, and Cape Victory on the north, on a small island belonging to Queen Adelaide's Archipelago.

This strait may be considered as divided into three parts. The eastern part extends from Cape de las Virgines to Cape Negro, and its direction, as far as the first narrow, is nearly west, but afterwards to the south of west. In two places the strait contracts to a width of 5 or 6 miles, forming the two narrows, of which the eastern is named de la Esperanza, and the second that of S. Simon. The country on both sides of this part of the strait is rather level, except that, at some distance from the shore, a range of hills rises on each side to a moderate height, but with rather a precipitous ascent. No trees grow in this country; the bushes are few in number and stunted; and the grass coarse, though abundant.

The central portion of the strait, from Cape Negro to Cape Froward, lies north and south, and is the widest part, extending in two large inlets, named the Useless Bay and the Admiralty Sound, deep into King Charles's Southland. This part of the strait is the easiest to navigate, being free from islands and cliffs, except the large Island of Dawson. The country on both sides rises into high mountains, especially in the neighbourhood of Cape Froward, and on the opposite coast of King Charles's Southland; some of the peaks are above the snow-line, which here occurs at about 3,500 feet above the sea level. Mount Sarmiento, on Tierra del Fuego, attains the height of 6,800 feet. Between the mountains there are valleys of some extent, which, as well as the lower part of the mountains themselves, are covered with a heavy growth of timber-trees.

The western part of the strait extends from Cape Froward to Cape Pillar, in a direction nearly S.E. and N.W. This part is very difficult to navigate

on account of its narrowness, the width varying between 5 and 25 miles, and also by reason of the numberless cliffs and islets with which the shores, especially on the north side are lined. To these disadvantages must be added the N.W. gales, which sweep with incredible force along the channel of the strait. The mountains, on each side, are not so high as along the central portion, and rarely attain the snow line; but their huge masses approach so close to the shores, that, in many places, it is difficult to find as much level ground as is required to place a boat upon. Land-locked basins, of moderate extent, however occur in several places, and afford safe harbours. The mountains, which consist mostly of granite and greenstone, are irregularly heaped together: most of them, for two-thirds of their height, are covered with trees of a stunted growth. Two large inland salt-water lakes are united with this portion of the strait. Nearly opposite the south-east extremity of the large Island of South Desolation (FUEGO) a channel opens eastward into the continent; this strait, named Jerome Channel, leads to Otway Water, a large inland sea, 50 miles long, trending to the N.E., and separated from the eastern portion of the strait only by a narrow isthmus. From this lake another channel, named Fitzroy Channel, 12 miles long, leads in a N.W. direction to another inland lake, named Skyring Water, which is about 34 miles long and 12 wide. The country bordering these lakes on the south and west, is high, rocky, and mostly covered with trees; whilst that which encloses them on the east and north is a low undulating grassy plain, without trees.

CAPE VIRGINS, a steep cliff about 300 feet high, in latitude $52^{\circ} 18' 35''$ S., and longitude $68^{\circ} 17' 30''$ W., is the southern extremity of the Patagonian coast, and the north entrance of the Strait of Magalhaen. A low shingly point named Dungeness, lies at $5\frac{1}{2}$ miles to the south-westward of the Virgins' Cape; and at 20 miles to the westward of Dungeness is the cliff, 300 feet in height, named Cape Possession. The last forms the eastern side of a shoal bay, which, under the name of Possession Bay, extends thence $7\frac{1}{2}$ miles to the westward, where the First Narrows of the Strait commences. A bank extends half a mile from the Virgins' Cape, and in rounding the cape H.M.S. Adventure passed at $1\frac{1}{2}$ mile from the land, sounding in 8 fathoms, stones; and then, standing to the South, crossed a bank of gravel, sounding regularly in 7 fathoms, until Dungeness Point bore S.W. by W., when the water deepened. In rounding the cape, unless the wind be easterly or southerly, a ship should pass within $1\frac{1}{2}$ mile of the cape, and steer S. by E. until Dungeness bears S.W., then to edge away round the latter point, and afterward the coast is clear to Cape Possession. In moderate weather, ships may anchor anywhere between Dungeness and Cape Possession: the bottom is of good holding-ground, and quite clean. At from 3 to 5 miles from the coast, the depth will be from 15 to 20 fathoms.

We know nothing of the Fuegian shore, or south side of the entrance. The Beagle, in beating in, made a board for 8 miles to the southward of Dungeness, and had 40 fathoms; but we believe the coast to be of shoal approach, and to be lined by a bank that is connected to the extensive reefs which project from Cape Orange.

Cape Possession, as before stated, lies on the north shore, and will be seen opening round Dungeness, on the magnetic bearing of nearly W. $\frac{1}{4}$ S.; the distance between them is 20 miles; at 10 or 12 miles to the west of Dungeness, Mount Aymond will make its appearance, bearing about W. $\frac{1}{4}$ N. Possession Bay curves in to the northward round the cape, fronted by an extensive shoal, stretching off for more than 4 miles from the shore, many parts of which are dry at half-tide; on its south side the depth diminishes gradually,

and offers good anchorage for vessels entering the strait to await the tide for passing the First Narrow.

On the western side of the bay are the Direction Hills, rendered remarkable by being of a darker green hue than others near them : after passing Cape Possession they afford a good mark for approaching the Narrows, which are not visible until well across the bay ; by attention also to their bearings, the shoal that extends off Cape Orange may be avoided. To take up an anchorage on the bank great attention must be paid to the soundings, which at the edge decrease suddenly ; it would not be advisable to anchor in less than 10 or 12 fathoms at high water, for the tide falls 6 or 7 fathoms ; but as the stream runs much weaker on approaching the edge of the bank the nearer to it the better. A good berth for anchoring is to get the northern Direction Hill (which is dark coloured and very conspicuous) to bear S.W. by W. ; Mount Aymond N.W. $\frac{1}{4}$ W. ; and the highest (easternmost) peaked hillock upon Cape Orange, about S.S.E. When the hill above noticed bears S W. by W., and Mount Aymond N.W. by W. $\frac{1}{4}$ W., you are in 19 or 20 fathoms, just off the edge of the bank ; about half to one mile more to the northward, or north-westward, good anchorage may be selected out of the strength of the tide.

There is, however, a more advanced situation about half a mile to the eastward of the end of the shoal, that may easily be taken up, namely, that where 14 fathoms is marked on the chart, for which the following are the bearings, the northern Direction Hill, S.W. by W. ; Mount Aymond, N.W. $\frac{1}{4}$ N. ; Peak of Cape Orange, nearly S.S.E. One mile more in advance to the S.W. would still be a better berth, but great care must be taken not to ground on the tail of the shoal ; at about half a mile more to the eastward the situation would be secure. Should the distant land behind Cape Gregory be seen, which makes with a long blue level strip of land, terminating at its S.W. end with rather a bluff or precipitous fall, it is a good mark for the above anchorage. There is also a conspicuous lump on the same land, which will be seen to the northward of the northern Direction Hill ; and the Asses' Ears, nearly out of sight, should be seen a little to the eastward of that part of the shore of Possession Bay where the clifly coast commences.

To avoid the north shoals do not get the north Direction Hill to bear more southerly than S.W. by W. ; and the mark for avoiding the reefs that extend off Cape Orange is not to get the same Direction Hill to bear more westerly than W. by S. $\frac{1}{4}$ S., until Mount Aymond bears nearly N.W. $\frac{1}{4}$ W., or the peak of Cape Orange S., when the fair-way of the First Narrow will be open, bearing S.W. by S. The N. or N.W. side of the First Narrow is a cliff of moderate height, and makes like a flat table-land. When abreast of Cape Orange, a S.S.W. course must be steered. The tide sets right through, so that in drifting, which with the wind against the tide, is the safest and best plan, there is no danger of being thrown upon the shoals.

The *First Narrow*, named Angostura de Nuestra Senora d'Esperanza, is 3 leagues long, and less than half a league wide. with clifly shores, the tide running strong, and the depth more than 50 fathoms, sand and pebbles ; and on the north shore there is a beach of shingle. In this part, however, as discretion must be the best guide, it will be necessary merely to state the dangers that exist. To the north of Point Delgada the shore is fronted by extensive shoals that dry at half tide : these should not be approached. The south shore, also, for nearly 5 miles to the west of Cape Orange, has a shoal off it, but it does not extend to a great distance from the beach ; beyond this it is not safe to approach either shore within half a mile, for each is fronted

by a bank that dries at low water. The western end of the narrow on the north shore, Point Barranca (meaning a cliff) has a considerable reef off it, upon which there is a very large quantity of kelp; besides these, no other danger is supposed to exist.

Having conducted the mariner through the First Narrows it is not the intention of the present work to continue the directions through the straits; a pilot or a good local knowledge of the navigation being far superior to any instruction that can be given. The valuable surveys made by Captains King and Fitzroy will, in a great measure, facilitate the navigation from either ocean. As Capt. King observes:—"No chart had previously existed, in which much confidence could be placed; but by the present survey the navigation through it, independent of wind and weather, has been rendered much easier, since a correct delineation of its shores, and plans of the anchorages, have been made." And Capt. Morrell, who has made this passage several times, says, "that the navigation is not difficult, and many good harbours are to be found, with anchorage under either shore, all the way through; the bottom generally good holding-ground. Within the strait the wind never blows fresh from N.N.E., round by the eastward to S.E. by E., consequently a shelter from these points is unnecessary. Wood and water can be procured with ease, fish may be caught in great abundance, and anti-scorbutic vegetables are found on both shores. Violent gales were never experienced from any quarter; the passage through seemed perfectly safe for vessels of any size, and the navigation pleasant and easy. Ships bound through the Strait may run day and night by keeping the north shore on board, until they come up with Indian Sound, (or longitude $72^{\circ} 20'$), and then keeping the south shore on board until they reach Cape Pillar, at the west entrance, on the Pacific coast. Thus they will have the advantage of the prevailing winds, and keep smooth water."

FROM THE EASTERN ENTRANCE OF MAGELLAN STRAIT TO CAPE HORN.

Queen Catherine's Point is the north-eastern extremity of King Charles' Southland, the largest of the islands of Tierra del Fuego; the description given of Dungeness on the opposite shore of Patagonia will serve as a description for this point, both of them being low and formed of shingle. About 10 miles inshore of Catherine's Point there is a tract of land elevated from 200 to 600 feet above the level of the sea, and running westward from Cape Espiritu Santo. From Catherine's Point to Cape Espiritu the coast is low; but from the latter point to Nombre Head the shore is formed by cliffs from 100 to 300 feet in height, with few breaks; the land is elevated 300 or 400 feet, and has an irregular shaped outline, without wood, and resembles the coast of Patagonia, only rather greener.

At nearly 8 miles to the southward of Catherine's Point is a reef with shoal water, lying 2 miles from Cape Espiritu Santo, which cape is a steep white cliff 190 feet high, similar to the gable end of a large but low barn. There is a low shingle beach, forming a spit, extending about 9 miles south-eastward from Nombre Head; on its eastern side the depth is not more than 10 fathoms, though suddenly increasing near the narrow steep point which forms its south-east extremity, where it may be closely approached. Within

this point, which is steep-to, or nearly so, the bottom is more regular, and the depth gradually decreases. This spit fronts a large bay, easy of access, about 15 miles wide and 12 deep, named San Sebastian; where a vessel may anchor well sheltered, except from easterly winds, which seldom blow, and never with any strength. On the north side of the bay there is no danger but what can be seen; the shingle is steep, and the bay shoalens gradually with regular soundings, and clean, good bottom. Off the south point of the bay, formed by Cape San Sebastian, a rocky ledge projects under water to the north-eastward, upon which there is no kelp; this point, therefore, must have a berth of 3 miles. On the extremity of this ledge the water shoalens suddenly from 12 to 4 fathoms; the bottom is hard, consequently does not afford good holding, and over it the ebb tide runs about 2 knots an hour. In this bay both wood and water are difficult to obtain. At its head the shore is so low as not to be seen from the deck of a vessel until it is within her horizon; this gave rise to the idea that there existed a channel here.

Cape San Sebastian is a bold cliffy point of a dark colour, behind which the land rises to the height of 1000 feet. From this headland to Cape Sunday the bearing and distance are S.E. $\frac{1}{4}$ S. 21 miles; the intervening shore is formed by a range of cliffs extending a short distance southward from San Sebastian Point, this is succeeded by low land, and this again by another small cliff, off which, about a mile from the shore, is a rock above water. From hence to Cape Sunday the coast is low, and has a shingle beach fronting it. Cape Sunday is a prominent point 250 feet high and of a reddish colour: a short distance off this point there are some rocks; with the exception of these the shore hereabouts is free from dangers.

Cape Penas is nearly 100 feet high and about 17 miles south-eastward from Cape Sunday, the coast between is low and free from danger; but around Cape Penas, to the distance of 2 miles, there are some dangerous rocks, upon which the sea mostly, if not always, breaks; nevertheless they should be carefully avoided, especially at night. Southward of this point there is a bay to all appearance affording good anchorage, but it is deceiving, being shallow with many rocks scattered about it. From Cape Penas, passing the bold headlands named Capes San Inez, Medio, and Pablo, there is no outlying danger to Cape Diego; the water is deep near the shore, but not so deep as to prevent a vessel from anchoring when southerly or westerly winds blow.

In latitude $54^{\circ} 50'$ S., and longitude 66° W. (of Greenwich) is situated a remarkable table-topped hill, about 1000 feet above the sea, named the Table of Orosco; between this and Point Diego are the Three Brothers, three conspicuous hills from 1000 to 1400 feet high, the westernmost of which resembles the Table of Orosco. Hereabouts are Policarpo and False Coves, neither affording shelter to boats.

A little to the northward of Cape St. Diego is Cape San Vincente, which is the western point of Thetis Bay; it is a dark-looking low bluff point, off which there are rocks and foul ground to the distance of half a mile. Thetis Bay is a tolerable place for a vessel to remain in for a few hours, when detained by wind or tide. In a line between the heads of the bay the tide runs across at from 1 to 3 knots an hour, therefore a ship should anchor off a green bluff at the west side, and within the line of the heads, when she will have from 6 to 12 fathoms of water, over a mixed bottom, in some places rocky, in others sand with mud and stone. When the wind is in opposition to, or crosses, the tide a heavy sea runs into the bay: there is much kelp to be seen, but no dangers could be discovered amongst it.

Cape San Diego is a low point, having a rocky ledge projecting from it

eastward, about 2 miles, which causes overfalls, strong eddies, and a heavy tide-race, to extend from the cape to a distance of 3 miles into the Strait of Le Maire; this at times is very dangerous; consequently, it will be prudent to give the cape a berth of at least 3 miles.

The Bay of Good Success is 7 miles south of Cape San Diego. If this bay cannot be distinguished by the indentation of the coast, the *broad road*, a barren strip of land on the height outside the harbour will serve as a good mark for it. It affords excellent anchorage, and is quite safe for vessels of any size to remain in to get wood and water, that is supposing they do not go too far in towards the sandy beach at the head; because during south-east gales a very heavy swell sets into the bay accompanied by dangerous rollers; and as the bay is surrounded by heights, some of which are elevated 1200 feet above the sea, it is subject to violent squalls when westerly gales blow. In winter it is advisable not to anchor so near the head as in summer, on account of the frequency of easterly winds during that season.

Six miles South from the bay of Good Success is a projecting headland which at first appears to be a cape; two rocky islets show themselves close to it, and, from a distance, have a resemblance to a ship under sail. Rather more than 2 miles S.W. from this headland is Cape Good Success, a high and bluff point with some rocks close to it, above water. It is situated in latitude $54^{\circ} 55'$ and is the S.E. point of Tierra del Fuego. The Passage between this portion of Tierra del Fuego and Staten Island is named the Strait of Le Maire.

STRAIT OF LE MAIRE.—In the southern part of the Strait of Le Maire regular soundings will be found of from 30 to 70 fathoms over a sandy bottom; but towards the north they diminish, and at 2 miles from Cape San Diego there are not more than 30 fathoms water, with rocky bottom. The strait is clear of all dangers, at a moderate distance from the shore, with the exception of the Jaseur Reef, which lies about 3 miles West from the Middle Cape of Staten Island; it was discovered by Capt E. Handfield, of H.M. sloop Jaseur, in 1826, when it appeared to be about $1\frac{1}{2}$ mile in extent, with a violent sea breaking over it.

The land on the western side of the strait from Cape Good Success to Maurice Cove (merely a rocky bight), is high and bold, with water for a ship as near as she ought to go; from hence to Cape San Diego the land is much lower and the water near it less deep. The eastern side of the strait is formed by the indented coast of Staten Island. Surrounding the rugged capes of this island are strong tide-rips which extend to a considerable distance from the shore, and render a near approach very dangerous. The Capes of St. Anthony, Middle (lat. $54^{\circ} 48' 20''$, long. $64^{\circ} 42' 30''$), and San Bartholemew are high and bluff promontories; the soundings to the northward of these are very regular, and said to give notice of your approach to the island or strait.

It has been said that it is difficult to tell the position of the strait of Le Maire, that a knowledge of the appearance of Staten Island, as well as Tierra del Fuego, is requisite; and navigators have passed without the island, being deceived by three hills on it resembling the Three Brothers on Tierra del Fuego. Capt. Cook says:—"There is no land on Tierra del Fuego like Staten Island, and the Strait of Le Maire can only be missed by standing too far to the eastward, without keeping the land of Tierra del Fuego in sight; if this be done, it may be missed, however accurately the appearance of the coast of Staten Land may have been exhibited; and if this be not done, it cannot be missed though the appearance of that coast should not be known."

TIDES.—The tides in the Strait of Le Maire are as regular as in any part of the world. They will assist a vessel materially in her passage, if taken at the proper time. On account of the width of the channel, its freedom from obstacles, the regularity of its soundings, and the proximity of Good Success Bay in case of any alteration in wind or tide, vessels may pass through without much difficulty or risk. In Good Success Bay it is high water on the shore and slack water in the strait at 4h. p.m., on full and change days, and low water with slack tide in the offing at 10, a.m. The rise of tide is from 6 to 8 feet perpendicularly, according to the state of the wind.

The flood runs by Cape San Diego with a velocity of from 2 to 4 knots, and in mid-channel of the strait from 1 to 3, of course more or less, according to the character of the wind. The flood tide sets through the Strait of Le Maire from the southward, and along the north and south sides of Staten Island from east to west. From Cape San Diego to the northward the tide sets north and west along the shore, from 1 knot to 3. The ebb sets in a contrary direction, but not so strongly. At the east side of the strait it is high water on full and change days at 5 o'clock. Near the Straits of Magellan as well as at Cape San Diego the stream of tide is much felt; but it is not so along the intervening coast.

Capt. Cook says:—"The entrance to this strait should not be attempted unless with a fair wind and moderate weather, and upon the very beginning of flood, which happens here, at the full and change of the moon, about 1 o'clock. It is always best to keep as near to the Tierra del Fuego shore as the winds will admit. By attending to these particulars a ship may go quite through the strait in one tide; or, at least, to the southward of Success Bay, into which it would be more prudent to put, if the wind should be southerly, than to attempt the weathering of Staten Island with a wind and lee current, which may endanger her being driven on that island."

STRAIT OF LE MAIRE TO CAPE HORN.—From Cape Good Success, previously described, the coast of Tierra del Fuego trends westward to Cape San Pio, a distance of 40 miles; between are Valentyn and Aguirre Bays, and Spaniard Harbour, which, on account of their exposure to the south, will only afford temporary anchorage during northerly or westerly winds. Between Valentyn and Aguirre Bays is a remarkable high and bell-shaped mountain, named Bell Mountain, which can be seen at a great distance seaward, from northward as well as from the southward.

The tide is felt strongly on this part of the coast, causing races and eddies near the projecting points. In the offing the tide sets towards the Strait of Le Maire, at from 1 to 3 knots, according to the force and direction of the wind. When the water is rising on the shore and the wind westerly, the current is very strong; but while the water is falling and an easterly wind blowing, it is not felt at all.

About 8 miles southward of Cape San Pio is New Island, upon which Capt. Cook observed some heights that were more visible from the east than from the west. Under this island, or near the shore to the northward, a vessel may have good temporary anchorage during westerly winds, but there is no good harbour between Richmond Road, westward of the island, and Good Success Bay.

Lennox Island is above 6 miles westward of New Island; small vessels may anchor in a cove on the east side; but large vessels must anchor in the road, where they will lie safely and well sheltered from all but south-east winds. North of Lennox Island is the eastern entrance to the Beagle Channel, a passage useless to ships; but on account of the straightness of its

course and the smoothness of its waters, it may prove serviceable to boats. It is, upon an average, about $1\frac{1}{2}$ mile in width, with deep water for the most part; but there are numerous small islands with rocks near them; from the eastern entrance to Week Islands a boat may pass without exposure to the outside coasts, or to the sea which is there found.

On the west side of Lennox Island there is an excellent place for shipping, named Goree Road, which is easy of access. The kelp in this place as well as that running from Guanaco Point, partly across the entrance, does not, as far as was ascertained, grow upon rock, but upon loose, detached stones; consequently, so much alarm need not be felt at its appearance. Wood and water may be obtained here without much trouble, and good anchorage may be had in 6 or 7 fathoms, over a sandy bottom.

To the southward of New Island are the Evout Islands, the centre of which is represented to be in lat. $55^{\circ} 33'$, and long. $66^{\circ} 41'$; and to the southward of these are the Barnavelt Isles, which lie 11 miles, N.E. by E., from Cape Deceit, in about lat. $55^{\circ} 48' 54''$, and long. $66^{\circ} 40' 20''$. Around these there is deep water, but it is advisable to keep to the eastward of them, as there may be dangers to the west, yet unknown. The space between New Island and Cape Deceit is said to be free from hidden dangers.

HERMITE ISLANDS AND CAPE HORN.—The northern shores of these islands afford good anchorage, and are tolerably free from dangers, whether outlying or hidden.

CAPE HORN is the southernmost headland of the Hermite Islands. Capt. Cook, in his passage in December, 1774, brought Cape Horn to bear E. by S., and says, it is known at a distance by a high round hill over it. A point to the N.W. shows a surface not unlike this; but their situation alone will distinguish the one from the other. Cape Horn is in lat. $55^{\circ} 58'$, and long. $67^{\circ} 13'$, and about 500 feet above the level of the sea; at a distance it presents no very striking appearance, but when passing near, it shows high, black cliffs towards the south. Westward of the cape, distant one mile, are three rocks, generally above water, upon which the sea constantly breaks; and off the east point of Horn Island are some small rocks and breakers.

Cape Deceit, called also by the names Cape Enganno and Mistaken Cape, is 9 miles, E.N.E. from Cape Horn; it is a rocky point, and the southern headland of the easternmost of the Hermites Isles, which is known by the name of Deceit Island or Wollaston. Off this cape are several rocks, but all above water, and 2 miles to the south-eastward there is a cluster elevated 30 or 40 feet above the sea, named Deceit Rocks.

The current off Cape Horn is as strong as on any part of the coast. Between it and Cape Pillar it is not at all regular; with flowing tide and strong wind it sometimes runs at the rate of 2 knots an hour, while at others it is not worth attention. Capt. King says, he never found it set to the westward at any time of tide, or with any wind. It is high water at Cape Horn on full and change days at about 4h. 30m., rise 8 feet.

REMARKS UPON THE PASSAGE ROUND CAPE HORN, by Captain P. P. King:—
 “Ships bound from the Atlantic to any of the ports in the Pacific will find it advantageous to keep within 100 miles of the coast of Eastern Patagonia, as well to avoid the heavy sea that is raised by the westerly gales, which prevail to the eastward, and increase in strength according to the distance from the land, as to profit by the variableness of the wind when fixed in the western board. Near the coast, from April to September, when the sun has North declination, the winds prevail more from the W.N.W. to N.N.W. than from any other quarter. Easterly gales are of very rare occurrence; but even when they do blow, the direction being obliquely upon the coast, I do not

consider it at all hazardous to keep the land on board. In the opposite season, when the sun has South declination, the winds will incline from the southward of West, and frequently blow hard; but as the coast is a weather shore, the sea goes down immediately after the gale. In this season, although the winds are generally against a ship's making quick progress, yet, as they seldom remain fixed in one point, and frequently shift backward and forward 6 or 8 points in as many hours, advantage may be taken of the change, so as to keep close in with the coast.

Having once made the land, which should be done to the southward of Cape Blanco, it will be beneficial to keep it topping on the horizon, until the entrance of the Strait of Magellan be passed.

With respect to this part of the voyage, whether to pass through Strait Le Maire, or round Staten Island, much difference of opinion exists. Prudence, I think, suggests the latter; yet I should very reluctantly give up the opportunity that might offer of clearing the Strait, and therefore of being so much more to windward. With a southerly wind it would not be advisable to attempt the strait; for, with a weather tide, the sea runs very cross and deep, and might severely injure and endanger the safety of a small vessel, and to a large one do much damage. In calm weather it would be still more imprudent, (unless the western side of the strait can be reached, where a ship might anchor,) on account of the tides setting over to the Staten Island side; where, if it becomes necessary to anchor, it would necessarily be in very deep water, and close to the land. With a northerly wind the route seems not only practicable, but very advantageous; and it would require some resolution to give up the opportunity so invitingly offered. I doubt whether northerly winds, unless they are very strong, blow through the strait; if not, a ship is drifted over to the eastern shores, where, from the force of the tides, she must be quite unmanageable."

Captain Fitzroy, whose authority, from his experience, must be very good, seems to think that there is neither difficulty nor risk in passing the strait (Strait of Le Maire). The only danger that does exist, and that may be an imaginary one, is the failure of the wind. Ships passing through it from the South are not so liable to the failure of the south-westerly wind, unless it be light, and then it will probably be from the N.W., at the northern end of the strait. The anchorage in Good Success Bay, however, is admirably situated, should the wind or tide fail.

In passing to leeward of Staten Island, the tide-race, which extends for some distance off Cape St. John, at the N.E. end of the island, must be avoided; otherwise there exist no dangers.

The anchorage under New Year Islands, although it is a wild one and the bottom bad, and the tide very strong, yet offers good shelter from S.W. winds, and may be occupied with advantage during the existence of a gale from that quarter; since it is unfavourable for ships bound round the Horn.

After passing Staten Island, if the wind be westerly, the ship should be kept upon the starboard tack, unless it veers to the southward of S.S.W., until she reaches the latitude of 60° S, and then upon that tack upon which most Westing may be made. In this parallel, however, the wind is thought to prevail more from the eastward than from any other quarter. Never having passed round Cape Horn in the summer season, I may not perhaps be justified in opposing my opinion to that of others, who, having tried both seasons, give the preference to the summer months. The advantage of long days is certainly very great; but from my experience of the wind and weather, during these opposite seasons, at Port Famine, I preferred the

winter passage, and, in our subsequent experience of it, found no reason to alter my opinion. Easterly and northerly winds prevail in the winter off the cape, whilst southerly and westerly winds are constant during the summer months; and not only are the winds more favourable in the winter, but they are moderate in comparison to the fury of the summer gales.

Having passed the meridian of Cape Pillar, it will yet be advisable to take every opportunity of making westing, in preference to nothing, until reaching the meridian of 82° or 84° , which will enable a ship to steer through the north-westerly winds that prevail between the parallels of 50° and 54° .

STATEN ISLAND.—This island is situated off the most south-eastern point of South America, being separated from it by the Strait of Le Maire. It is 38 miles in extent from Cape St. John to Cape Bartholomew, and is described as extremely mountainous and rugged, composed of lofty hills (2000 and 3000 feet high), the summits of which are covered with snow during the greater part of the year. The coast throughout is formed of rocky cliffs from 200 to 500 feet in height, which, for the most part, are steep-to, having from 15 to 20 fathoms close to their bases. The numerous projections and indentations of the island are merely continuations of ranges of hills and valleys, consequently all the harbours preserve nearly the same direction as the valleys and are surrounded by high land, the water deepening rapidly towards their centres.

Here the force of the tides is very great; this, together with the position of the headlands, in relation to the direction of the tides, causes a rough breaking sea, when the wind is strong and contrary, which is dangerous for a large vessel and impassable by a boat. Southward of the island the tide is scarcely perceptible; but there is a remarkable undertow which renders it dangerous for a boat to stretch across the mouths of the deep bays, on account of the difficulty met with in again closing with the land. It is for this reason that the sealers constantly follow the circuitous route of the shore. High water at full and change at 3h. 50m. Rise 7 to 9 feet.

Off the north side of Staten Island is a group of small islands affording a sort of protection from westerly winds, named the New Year Isles; under the north-eastern of these there is anchorage in 17 fathoms; but this is liable to the influence of any wind between N. and E.N.E., the bottom is rocky, the tides rapid, and the distance of the eddies from the land so uncertain, that it is no easy matter for a vessel to keep clear of her anchors.

St. John's Harbour is on the north-east extremity of Staten Island, and known at a distance by Mount Richardson at its head, and on a nearer approach by a remarkable cliff on the eastern shore. In making for this harbour attention must be given to the rapidity of the tide running across its mouth; to the gusts of S.W. winds that come from the mountains, which are exceedingly violent; and to the kelp which lines the shores, and serves as an excellent mark for the unnavigable parts of the harbour: the edge of this kelp is almost always in 8 fathoms, and generally near the shore. At the head of the harbour, distant 3 miles S.S.W. from the entrance, is good shelter for a vessel in a depth between 5 and 20 fathoms, sandy bottom; on account of the gusts of wind from the mountains it is advisable to moor with an open hawse to the S.W. Off the western point of the entrance there is a rock which requires a berth.

Further to the westward is Port Cook in which a vessel will find shelter and good anchorage in not too deep water; the prevalent winds are regular, and there is an easy communication with the south side of the island. Its

entrance is very narrow with a depth of only 6 fathoms, but within the depth increases to 16 and 20 fathoms.

New Year Harbour is about half a mile broad and extends 3 miles to the S.W.; the depth varies from 20 to 45 fathoms, with a bottom of mud and sand. The passage in is on the eastern side of a cluster of islets lying in the entrance.

Port Basil Hall is a most convenient anchorage when once attained, and well sheltered from all winds, though the whirlwinds exist here as well as in the other harbours of this island; but, on account of the lowness of the south-western shore, they are not so violent. The mouth of the harbour is contracted by two rocks, which, together with the depth of water, renders the access difficult without suitable wind and tide. When in pass on the eastern side of the dangers pointed out by the kelp, and anchor on the western shore between a small green island, whose southern side must have a good berth, and a fine sandy beach to the northward of the island in from 7 to 10 fathoms. Wood and water can be obtained in abundance.

Port Parry is the first opening to the westward of New Year Island, and may be easily distinguished by a quoin-shaped mount on its eastern side. The harbour is divided into two parts by the contraction of its opposite shores. Good anchorage may be obtained, southward of a small grassy islet on the eastern shore of the inner harbour, in 9 or 10 fathoms, sandy bottom; from hence the water deepens to the head of the harbour, where a vessel may be moored, opposite to a sandy beach, with an open hawse to the S.S.W., for squalls are frequent and violent, though not to be apprehended by a vessel well moored. A leading wind is indispensably necessary for sailing through the contraction. In the outer port is a rocky patch with only 4 fathoms upon it; here a vessel might find temporary anchorage as the water shoals gradually up to it.

Port Hoppner is next westward of Port Parry; it is sheltered from N.W. winds by a rocky island at its mouth, for the space of half a mile within which anchorage may be taken in from 8 to 20 fathoms. This harbour is likewise divided into two parts. Near the head of the outer harbour there is anchorage close to the shore, which is high and precipitous on the western side. This is the westernmost harbour in Staten Island, there are, however, small coves on the eastern side of Flinders and Crossley Bays where anchorage may be found, but these are unprotected from the sea and prevalent winds.

On the South side of Staten Island is Port Vancouver where refuge can be taken during S.W. gales. A vessel may ride quite secure in 16 or 17 fathoms, sandy bottom, close to a small river, and near a convenient wooding place in the western arm. On the eastern side of the entrance there is a rocky island always visible, and a reef runs some distance from the south point of the western arm, to avoid which do not haul up for the anchorage until a remarkable white ravine on the south shore becomes visible. A ship must moor with an open hawse to the westward. This harbour is the first opening eastward of the Dampier Islands. Back Harbour has not good qualities, farther than good holding-ground, for which it can be recommended; though small vessels have occasionally sought refuge from N.W. winds. •

SECTION V

ISLANDS, ROCKS, AND DANGE.

ATLANTIC OCEAN.

ISLANDS.

NAMES.

change, at 5 hours,
ebb N.E., at therd to Bom-
the night
Bouvet
freeze
11.

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The Notes referred to will be for

NAMES.	SOUTH LAT.	WEST LONG.	MARKS.
	DEG. MIN.	DEG. MIN.	
Silhouette Vigia.....	0 20	20 50	<i>Vide Note 1.</i>
Aquila Reef.....	0 22	21 6	<i>Vide Note 2.</i>
Bouvet's Sandy Island	0 23	19 10	<i>Vide Note 3.</i>
Triton's Bank	0 32	17 46	<i>Vide Note 4.</i>
Shoal of Manoel Luis...	0 52	44 13	<i>Vide Note 5.</i>
Crown Reef.....	0 57	23 19	<i>Vide Note 6.</i>
Prince's Shoal.....	1 35	17 15	<i>Vide Note 7.</i>
Submarine Volcano ...	2 30	20 44	<i>Vide Note 8.</i>
Fernando de Noronha, the Pyramid	3 50	32 23½	<i>Vide Note 9.</i>
The Roccas.....	3 55	38 43	<i>Vide Note 10.</i>
Ascension Island (the Barrack)	7 55½	14 25½	<i>Vide Note 11.</i>
St. Helena (the Obser- vatory)	15 55	5 42½	<i>Vide Note 12.</i>
Bank of Antonio Viana	17 30	8 15	<i>Vide Note 13.</i>
Martin Vas Rocks (the Central).....	20 28	28 41	<i>Vide Note 14.</i>
Congress Bank.....	20 30	37 30	<i>Vide Note 15.</i>
Isle of Trinidad	20 31	29 21	<i>Vide Note 16.</i>
Island Ascensao	20 35	37 8	Doubtful. <i>Vide Note 17.</i>
Columbus, or Saxem- burgh Island.....	30 18	28 20	Very doubtful. <i>Vide Note 18.</i>
Grant's Breakers	31 33	11 30	Position not accurately ascertained. <i>Vide Note 19.</i>
Laurel Shoal	36 28	51 30	<i>Vide Note 20.</i>
Trista D'Acunha (the Waterfall)	37 6	12 3	<i>Vide Note 21.</i>
Inaccessible Island (Centre)	37 19	12 23	<i>Vide Note 22.</i>
Lennon's Reef.....	37 31	4 42	<i>Vide Note 23.</i>
Robson Reef.....	37 35	7 30	Doubtful. <i>Vide Note 24.</i>
Telemaque Rock (Cen- tral Breakers)	37 57	23 0	Position doubtful. <i>Vide Note 25.</i>
Ariel Rocks	40 0	57 37	<i>Vide Note 26.</i>
Gough's Island	40 20	9 45	<i>Vide Note 27.</i>
Isla Grande.....	* *	* *	Very doubtful. <i>Vide Note 28.</i>

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14
15

entrance is very narrow increases to 16 at New Year S.W.; the sand. The the or Circumci- on Island	SOUTH LAT.	WEST LONG.	REMARKS.
	DEG. MIN.	DEG. MIN.	
	54 15	6 11 E	<i>Vide Note 29.</i>
Aigle Shoal.....	51 51	64 30 W	Doubtful. <i>Vide Note 30.</i>
Aurora Isles.....	* *	* *	Very doubtful. <i>Vide Note 31.</i>
The Shag Rocks.....	53 48	43 25	<i>Vide Note 32.</i>
Kain's Islet.....	54 9	59 36	Doubtful. <i>Vide Note 33.</i>
Pottinger's Bank.....	54 36	57 49	<i>Vide Note 34.</i>
Alexander Island.....	68 57	73 0	} <i>Vide Note 35.</i>
Peter Island	68 0	91 0	

NOTES TO THE PRECEDING TABLE.

1. SILHOUETTE VIGIA.—On the 5th of February, 1754, the people on board the ship Silhouette, commanded by M Pintault, felt a shock, or violent agitation, as if the vessel had touched upon a shoal. It was then about 5 p.m., and from the latitude taken by that very day's observation, this dangerous spot should be 20' to the southward of the line, in about 20° 50' W. longitude, according to their reckoning, which they traced upon the French chart, from the road of Praya, in the Isle of St. Iago. On the 13th April, 1758, the frigate La Fidele, M. Le Houx, commander, felt the like shocks, in 20' S. latitude, and 18° 0' W. longitude.

2. AQUILA REEF.—On the 12th April, 1831, the Aquila, of Scarbro', Captain John Taylor, was in latitude 22' 15" S., and in longitude 21° 6' 30" W., light winds and fine pleasant weather. At 40' p.m., the water being very smooth, and the ship going at the rate of 5 knots, a loud rumbling noise was heard under her bottom, and a sensation felt, exactly like that of a vessel sliding over a rock: the rudder was so much agitated, that the man who was steering could scarcely hold the wheel. No difference could be observed in the colour of the water, nor the smallest rippling. The situation of the Aquila is very near the Silhouette, above described.

3. BOUVET'S SANDY ISLE.—On the 3rd of May, 1761, Le Vaillant, Captain Bouvet, about 1 p.m., saw a small rocky island, which bore N. by E. The latitude, by reckoning at noon, was about 23' S., and their longitude, reckoned from the sight of Ferro Island, which they made on the 8th of April, was about 19° 10' W.—See Note 36, page 309.

4. TRITON'S BANK.—On the 18th December, 1816, Captain Proudfoot, in the ship Triton, passed over this shoal. It appeared to extend in an E. and W. direction, 3 miles, and in a N. and S. direction, one mile. Sounded in 23 fathoms brown sand; saw no appearance of breakers.—See Note 36, page 309

5. SHOAL OF MANOEL LUIS.—This shoal lies off Maranham, in latitude 0° 52' 10" S., and longitude 44° 13' W. It extends more than half a mile across from N. to S., but not less than 3 miles in an E. by S. and W. by N. direction. It is formed by a cluster of conical rocks, whose heads are just beneath the surface of low tides, having small openings of deep water (8 to 10, and 17 fathoms) between them, which renders it the more dangerous; as in case of striking thereon, a vessel would, most probably, go down immediately. The utmost precaution, therefore, is necessary, in order to avoid this danger, as it shows itself occasionally at low tides, and then

but slighty. It is high water on the reef, on the full and change, at 5 hours, when the tides rise 12 feet, the flood setting S.W., and the ebb N.E., at the rate of three-fifths of a mile an hour.

6. CROWN REEF.—The barque Crown, of Liverpool, bound to Bombay, struck upon something, which was supposed to be a reef, on the night of the 9th February, 1835. After crossing the equator, with a pleasant breeze at E.S.E., carrying fore-topmast studding-sail, going $6\frac{1}{4}$ knots, at 10h. 45m., touched the ground, and grated with the keel, as if passing over a coral reef. So soon as clear, the boat was lowered down, but no bottom was found at the depth of 120 fathoms. The latitude of the spot was 57° S., and the mean longitude, by chronometer and lunars, $23^{\circ} 19'$ W.—*Nautical Magazine*, 1835, page 577.

7. PRINCE'S SHOAL.—On the 17th October, 1747, the ship Le Prince, Captain Bobriant, in its passage to India, felt one or two shocks, as if it had struck upon a shelf. She was at the time in latitude $1^{\circ} 35'$ S., and longitude $17^{\circ} 15'$ W., reckoned from the sight they had of the Isle of Brava.

8. SUBMARINE VOLCANO.—On the 19th May, 1806, Admiral Krusenstern saw in the direction of N N.W., and at the distance of 12 or 15 miles, a singular phenomenon, but which, owing to the lateness of the day, was unable to examine sufficiently close to ascertain the nature of it. A cloud of smoke arose to about the height of a ship's mast,—disappeared suddenly, then rose again, and vanished entirely. It could not be a water-spout, nor a ship on fire, as some persons on board conceived; for the smoke rose much too high, and Dr. Horner was of opinion, that if the whole was not an ocular deception, occasioned by a peculiar refraction of the rays of light, it had all the appearance of a volcanic eruption, and was possibly the forerunner of an island.—See Note 36 to "Rocks, Shoals, and Dangers in the North Atlantic Ocean," page 309.

9. FERNANDO DE NORONHA.—This island has frequently been visited by ships bound to India, occasioned by the currents having set them to the westward, after the failure of the N.E. trade-wind. It is a remarkable island, and is readily known by a high rocky peak, named the Pyramid, very barren and rugged, which seems to lead to the eastward, when it bears S.S.W., and by its S.W. point, which is perforated, and gives a free passage to the sea, and therefore, by some, named the Hole in the Wall. Off this point, at a considerable distance, lies a sunken rock, which is dangerous to approach. From the S.E. part of the island, named Tobacco Point, a reef extends to seaward a considerable distance; and a rocky patch, on which the sea always breaks, lies $2\frac{1}{4}$ or 3 miles S.E. by S. from this point, and nearly $3\frac{1}{4}$ miles S. $\frac{1}{4}$ W. from the east point. There is a channel of 10 to 15 fathoms water within this patch, and when on it, the Pyramid will be shut in by the highest hill. Captain Foster's observations, revised by Dr. Tiarks, give the Peak or Pyramid as in $3^{\circ} 50' 10''$ S., and $32^{\circ} 23' 15''$ W.

FERNANDO DE NORONHA is about 7 miles in length, and 2 or $2\frac{1}{4}$ miles broad. It produces black cattle, sheep, poultry, melons, corn, &c. It is inhabited by Portuguese exiles, and has a strong garrison, and all the little sandy bays and anchoring places are defended by forts. The road is on the north side, near the N.E. end of the island, and the anchorage is tolerably good in 9 to 13 fathoms water, at about half a mile from shore, with the Pyramid bearing from S.S.W. to S.W. It is quite exposed to northerly and westerly winds, which are said to prevail here from December to April; at other times they are mostly S.E. or westerly, and sometimes at N.E. The surf is frequently high, and at such times there is no landing. Fresh water may be procured

from a well near the governor's house, but it is a scarce article in the dry season, and cannot always be got off from the shore, on account of the surf. On the south side of the island, to the eastward of Tobacco Point, is a small bay, named the Port, fit for boats only, where it is said fresh water may be procured from a rivulet.

The currents generally run strong to the westward, therefore the necessity of approaching the road by Rat or Wooding Island is obvious. Rat Island is about $1\frac{1}{2}$ mile in length, and lies about $1\frac{1}{2}$ mile from the N.E. end of Fernando de Noronha. It produces grass and fire wood, with some wild goats; but the wood will sink if thrown into the water, and there is great risk in staving the boat while getting it off from the rocks. The tide rises about 6 feet, and flows, on full and change days of the moon, until 4 o'clock.

10. THE ROCCAS lies about 50 miles to the westward of Fernando de Noronha; they are low sandy islands, apparently connected together by a reef, nearly level with the edge of the sea. These cannot be seen, even from the mast-head, in the clearest weather, for more than 3 leagues; they are surrounded with breakers, projecting out at the north and south ends of the shoal, their extent being 5 miles. Vessels passing between Fernando de Noronha and the Brazil coast, at night, must be particularly careful to avoid these dangers, for they have proved fatal to many. Within 2 miles of their western extremity were found 28 fathoms, coral rock, and the current sets over them to the westward, at the rate of $2\frac{1}{2}$ miles an hour. Rise 6 feet.

11. ASCENSION ISLAND is of an oval form, $7\frac{1}{2}$ miles long, and $5\frac{1}{2}$ wide. Like all the islands in the Atlantic, it is of a volcanic origin, presenting a surface of rugged conical hills, of different sorts of lava, from 200 to 300 feet in height, some of them with perfect craters. At the eastern part of the island is a double-peaked mountain, of gritty tufaceous limestone, which rises to the height of 2,818 feet, and, from its comparatively verdant appearance, has obtained the name of Green Mountain. The whole island is of a naked, desolate character, with a vast quantity of rocks lying upon each other in a very irregular way, with great chasms between them, and strewed with scorïæ, pumice, and other volcanic substances, so that one might as well walk over broken glass bottles. The sea-coast is alternately of a black nitrous lava, and of white beaches, formed by the pulverization of coral and shells, with calcined stones as light as dust. There are, however, about the middle of the island, between the hills, several little plains, divided into small spaces, and so remarkably distributed as to appear like parcels of land cleared of stones, and separated by walls.

The island was discovered by Joao da Nova Galego, in 1501, and is said to derive its present name from having been seen on Ascension day. It was then entirely barren and uninhabited; not a shrub was seen, and the only vegetation which it produced was some coarse grasses, ferns, purslain, a species of convolvulus, and a milk-thistle. There were goats, rats, mice, land crabs, and some few insects on the island. It was also much frequented by sea-fowl, such as the frigate and tropic birds, tern, boobies, and gannet, with whose nests the lower part of the island was covered; being hitherto undisturbed by man, they suffered themselves to be knocked down with sticks, or even laid hold of while sitting on their eggs. Turtle were found in great abundance, and the bay afforded a plentiful supply of fish—cavalies, old-wives, couger-eels, and rock-cod; in consequence of which, the island was much frequented by homeward-bound vessels from the Cape of Good Hope and the East Indies. It was also a great resort for smuggling-vessels from





ASCENSION.

Surveyed by Lieut. E. F. Bedford, R.N., H. M. S. Raven.

*brk broken c. coarse corl coral d dark f fine g grey
gr gravel r rocky rd rd s sand sh shall st stones*

Nat. Miles



Soundings in fathoms.

Our American colonies, who used to meet the Indiamen here, on their return home. It was long supposed to be without any stream or spring of fresh water whatever; but small springs have since been discovered, and have obtained the name of Dampier's Springs, from that celebrated navigator having been cast away here, on his return from New Holland.

In 1815, during the confinement of Napoleon at St. Helena, the British Government took possession of Ascension, as a military station, and maintained on it a garrison, consisting of a naval lieutenant, as governor, with 60 officers, seamen, and marines, who fortified the island with 17 guns, the greater number at English Road, where they erected barracks and store-houses of the compact lava (the pulverized coral on the beach forming excellent cement), and contrived to cultivate small gardens, and rear some live stock. A look-out station was established on Green Mountain, where a small spring was discovered, which soon yielded an average daily supply of about 140 gallons.

In 1821, the establishment was changed to a major of marines, as governor, with a staff of officers, and a party of about 200 privates, most of whom were artificers and labourers, with a number of liberated Africans. From the attention and exertion of the garrison, the island is now in a state of progressive improvement as to its resources, natural and artificial. Roads have been made, and iron pipes laid down, to convey the water from the springs (an operation that used to be performed by asses and mules) to the fort, near which a large tank has been excavated, capable of containing 1,700 tons, by which it is hoped that a supply of water may always be obtained sufficient for a squadron. Pasturage is rapidly making its appearance. There is a moderate supply of cattle and sheep, which, with turkeys, guinea-fowl, and almost every description of live stock, thrive well; geese and ducks, however, succeed but indifferently, owing to the want of fresh-water streams and pools. The wild goats, to the number of about 600, are allowed to wander in herds, feeding on the herbage they can procure, amongst which are some aromatic herbs, which give a peculiarly fine flavour to the mutton. During the season, which is between February and July, when the turtle come ashore for the purpose of depositing their eggs, parties are stationed on the beach, to turn as many as are likely to be required before the next season, which are afterwards kept in a large salt-water pond, to be taken out at pleasure. Their general weight is from 400 to 700 lbs.

In order to destroy the rats, with which the island was overrun, a number of cats were introduced, which, however, multiplying and becoming wild, proved very destructive to the young fowls and rabbits, so that the garrison have been compelled to call to their assistance a colony of bull-terriers, to wage war on their combined enemies of the feline tribe. Guinea-fowl are very abundant; partridges, pigeons, and rabbits, from the Cape of Good Hope, with other species of game, have been imported, and the horse has lately been added to the list of their useful and domestic animals.

On the Green Mountain, above the height of 2,000 feet, all vegetation ceases; the soil is a rich mould, yielding sweet potatoes, Cape gooseberries, onions, carrots, peas, beans, cabbages, radishes, and, in short, almost every species of esculent vegetables: there are at present upwards of 70 acres under cultivation. In the valleys also, where the soil offers any prospect of success, spots are set apart for the cultivation of vegetables. Several kinds of fruit have been successfully tried,—and thus an island, which was once a desert cinder, now yields most useful vegetable productions; and as the climate is exceedingly healthy, it is obvious that this establishment will repay the liberal attention that has been bestowed upon it, by affording an eligible

rendezvous, and depôt of stores and provisions, for any squadron destined either for the coast of Africa or Brazil.

The *Anchorage*, though an open bay, is perfectly safe, and the island is never visited by gales of wind, but a heavy surf rolls on the beach, which sometimes interrupts the communication with the shore for days together. There is no regular tide, and the rise and fall is very trifling. On Green Mountain the annual range of Fahrenheit's thermometer is from 58° to 82°.

MR. WILLIAM WALKER gives the following description of this island:—
“The island is of an elliptical form, its greatest diameter from east to west being $7\frac{1}{2}$ miles, and its shortest from north to south, $5\frac{1}{2}$ miles. The area of its base, at the surface of the sea, is 38 square miles, and its circumference about 22 miles.

ASCENSION is of volcanic origin, and of comparatively recent formation, its surface being exceedingly irregular, and presenting, from the sea, a barren and forbidding appearance. The highest peak on Green Mountain is elevated 2,805 feet above the sea, and may therefore be seen, from a frigate's deck, at the distance of 65 miles. The latitude of the summit is, from several observations, $7^{\circ} 57' 22''$ S.; and if the longitude of the fort be $14^{\circ} 24'$, that of the peak will be $14^{\circ} 19'$. From the summit of Green Mountain about 40 tumuli may be seen, of different magnitudes, being extinguished craters, which have, at different periods of the volcanoes, actually given vent to its fires. From many of these craters one may trace distinctly the direction of the lava currents, on their way to the sea.

All the different varieties of the lavas of Vesuvius may be found here apparently in a rapid progress of decomposition, so that, at some future period, this island, like other volcanoes, will be one mass of rich mould. Many of the round conical hills are already fit for being planted with vines; their soil being composed of ashes and a ferruginous earth, a decomposition of calcined ores of iron; of this description is Red Cross Hill, near the anchorage, having an elevation of 870 feet above the sea; but so dry and porous is the soil, that no sooner does the rain fall than it is absorbed and disappears.

The principal cultivation is on and about Green Mountain, where it rains more frequently than on the less elevated parts of the island. The principal garden is 2,500 feet above the sea: here the climate is delightful, the temperature during the day-time being generally about 74° , that at the landing-place, near the fort, being 85° . The temperature on the peak is still lower: my thermometer, exposed to the current of air sweeping over the peak, fell to 60° ; this was at one p.m., the instrument being in the shade, and the sun shining at the time. The summit of Green Mountain is covered with rock-roses, and several species of fern and mosses, indigenous to the island.

The climate of Ascension is perhaps as healthy as in any part of the world, and its salubrity is no doubt owing to the constant trade-wind blowing in a moderate breeze, ventilating and cooling every part of the island; the dryness of the air, and the absence of marsh or moist soils contribute to the elasticity and buoyancy of the air, and render the island a most desirable spot for an invalid, who might be transported from Tartar Stairs to the mountain in two hours, the distance being 7 miles, from a temperature of 84° to one of 74° . Abundance of purslain grows among the rocks, stones, and crevices of the cliffs: this vegetable is eaten by the cattle, and is capable of keeping them alive and in tolerable condition, as was evident from a bullock making his escape, and being absent five or six months, during which time he had nothing to eat but purslain.

The weather side of the island is high and inaccessible, with an iron-bound coast, and deep water. No part of the coast is accessible from South-west Bay, round the south point of the island, and as far as North-east Bay. From the south point of South-west Bay, and along the lee side of the island to English Bay, there is an excellent anchorage in from 10 to 20 fathoms water, sand and mud: within the distance of 6 miles 300 sail might be anchored at the distance of 100 fathoms from each other; for although the coast from the fort round to South-west Bay be rocky, with foul ground extending about half a mile into the sea, yet I found the bottom perfectly clear without the depth of 10 fathoms.

I have already stated that upwards of 40 craters have, in former times, been in a state of activity. Now the island lying within the limits of a constant brisk S.E. trade-wind, the ashes, pumice, dust, &c., ejected by the volcanoes, have been carried by the wind into the sea to leeward of the island, and formed an excellent anchorage; the bank, thus formed, has, in the course of time, been augmented by vast quantities of small shells ground up together, and polished by the action of the waves; and it is those fine pieces of shells that form the various beaches on the lee side of the island, where the sea-turtle deposits her eggs to be hatched by the heat of the sun.

Wherever there is a prevailing current in the air or ocean, at an island, the dust in the air, or the sand in the sea, is carried by the current and deposited to leeward where a bank is formed on which ships may anchor; this is the case at St. Helena, Ascension, the Madeiras, the Canaries, Cape Verde Islands, &c.

Ascension is visited by the sea-turtle between Christmas and Midsummer, and it is supposed that, during the above period, each female makes three or four nests. The animal remains on the coasts of the island till 50 or 60 eggs are fit for being deposited in the sand. She then lands on the beach, between 10 o'clock at night and 4 in the morning, and going sometimes 150 and 200 yards above high water mark, digs a large pit, about 8 or 10 feet in diameter, and 2 or 3 feet deep, where the eggs are deposited and carefully covered with sand; she then leaves them to nature. In about 9 or 10 weeks the young turtle breaks its prison, and working its way upwards through the sand, gains the surface and proceeds directly to the sea. Should this journey happen in daylight, many of the young animals are picked and devoured by the man-of-war bird, who may be seen hovering over the turtles' nests. For this species of warfare in destroying the young turtle, the man-of-war bird is shot, or otherwise destroyed, by the officers of the garrison.

There are abundance of excellent fish to be caught among the rocks throughout the year, such as rock-cod, conger, cavalhos, &c.; they are so plentiful, that a boat's crew may catch enough for a frigate's ship's company. The best place for fishing is on the reef, near the anchorage, beginning with a piece of salt pork for a bait, and afterwards cutting up a fish for bait. Cray-fish are also caught near the mouths of caverns amongst the rocks toward English Bay, the method is as follows:—Hang a piece of fish or pork by a string, a short distance below the surface of the water at the mouth of a cavern, the cray-fish observing it will rise to the bait, and may be taken by hand.

The coast to leeward of the island is bold and clear from English Bay to the fort near Tartar Stairs. About a mile to the north-east of the fort there is a small bay, with a spot of sand on it, on which a boat may land among wild and irregular climpers; this spot has been dignified by the name of Comfort Cove, and extolled very much above its real merit. From the foot of Fort Cockburn, round to the westward as far as South-west Bay, the coast

is, as has been already observed, rocky. The reef runs out about seven-tenths of a mile from the fort in a north-west direction: it is composed of uneven masses of hard, pointed lava, with spots of white sand in hollow places; there are many of these pointed rocks on which a ship would strike, and on some which ships have actually struck; and to prevent such accidents for the future, a large buoy is now moored near the extremity of the reef, on a rock having 30 feet water on it. The following are its marks:—The flag-staff on the fort in a line with the north-east corner of the jetty near the crane at Tartar Stairs and the peak of Green Mountain, just touching the edge of Red Cross Hill. Should the buoy be gone, by keeping in 10 fathoms a ship will avoid all the dangers on the reef.

It sometimes happens that a very heavy swell sets in from the south-westward, occasioned by gales of wind without the limits of the trade-winds in the South Atlantic. The long swell rolling in against the wind, and meeting with shoal water, and the uneven rocky bottom of the reef, breaks high and with violence, sweeping away thousands of tons of sand from the beach into deep water; this sand is again thrown on shore in fine smooth water. These rollers are heaviest when the sun is in the northern hemisphere, and storms and tempests in the South Atlantic, in the neighbourhood of Cape Horn.

Two pair of moorings are laid down near the landing-place for the use of H.M. ships; one pair abreast of the middle of the sandy bay to the eastward of the fort, and as near the weather shore as possible. The groundwork is a line-of-battle ship's chain, and the bridles are tapered from line-of-battle ships' chain to sloops', the small end being suspended to the buoy for the convenience of being taken without lighters. The other pair is laid down near the edge of the reef, one of the anchors being among the rocks, thereby leaving the best of the anchorage unoccupied. At the inner mooring, in case of necessity, one vessel might be hove down by means of another.

About half a mile inland from South-west Bay, and behind the lava currents, lying near the beach, there is a tract of land of comparatively smooth surface, and of considerable dimension; the soil is very rich, but so dry and dusty as seldom to exhibit any other verdure than a little purslain. A little farther to the south-eastward, and behind some high conical hills, there is a sandy plain, having an area of, perhaps, 20 or 30 acres. This level is surrounded by the above-mentioned conical hills on the north, and on every other side by high ridges of lava, through which the rains have worn "firu-mari," or water-courses, by which considerable quantities of sand and pumice have been discharged into the plain. I could trace very distinctly a line of pumice and other floating material's on the foot of the hills along the lee side of the plain, left as the last high-water mark, and shewing most clearly that, at times, there has been a depth of several feet of fresh water in the valley, a quantity sufficient to supply the island for many years. This affords the strongest proof of the occasional heavy rains that must fall at Ascension, and points out the propriety of constructing tanks in eligible situations.

The principal supply of fresh water is obtained on the Green Mountain, where there are several drips of water, which yield from 500 to 1,500 gallons daily, according to the wetness of the season. The rain falling on the mountain is absorbed by the porous and light soil, and descends by its gravity till it meets with a thin stratum of pumice dust, which in the course of time has been in a manner petrified; this arrests the water in its progress downwards, and, being generally inclined to the horizon, the water glides along and appears on the surface of a cliff in the shape of a spring. It is to be regretted

that the strata above-mentioned are faulty in so many places, that much water passes through the rents, and is lost in the soil below.

There are two very good stone tanks built in the mountain in contact with and parallel to rocky cliffs. The surface of the rock has been cleaned and gutters cut, by which means all the water that is not absolutely absorbed during rains, on a very considerable surface, must run into the tanks. The tanks in the mountain are to be connected with others below, near the landing place at Tartar Stairs, by means of cast iron pipes, the distance between them being 5 miles."

ANCHORAGE OFF ASCENSION.—Captain Hunt, of the ship *Atlas*, March, 1832, gives the following remarks on the anchorage:—"The Island of Ascension being both convenient and safe for ships, homeward-bound, to approach, when in want of provisions,* water, or repairs, and Captain Bate,† with the officers of that establishment, most attentive and ready to relieve the wants of ships, of any nation, resorting thither, and their means to do so, and to render assistance, being superior to any other place between the Cape of Good Hope and the ports of Europe, it is to be regretted that accidents so frequently happen to vessels touching there; in most cases, through want of knowledge as to the position of the rock and reef lying N.W. of the anchorage.

The anchorage is in Sandy Bay; a prominent rock, on which is a fort, forming its western boundary. Ships may anchor in any part of this bay, in moderate depths of water, as the bottom is clear, and free from danger.

Commanders of ships, coming from the eastern side of the island, intending to anchor or cruize off the settlement, until they have obtained supplies, must observe that no safe anchorage can be found to the westward of the fort, neither is the shore safe to approach within a mile and a half of it to the westward.

The best guide to clear the reef and rock, lying to the N.W. of the anchorage, and on which many vessels have grounded, is to keep the houses and barracks open to the eastward of the fort, and never to shut them all in with, nor open them to, the westward of the fort, unless the distance from the land be, at least, a mile and a half. In the latter case they would be in great danger of striking on the reef above-mentioned, the spit or rocks of which lie nearly a mile from the nearest point of the shore.

A buoy, chequered black and white, is laid on the spit. When this buoy can be seen, a vessel should never pass to the westward of it, unless her distance from the land be, at least, one and a half mile. The sea does not

* The following letter is copied from the *Nautical Magazine* for 1839, page 167.—"Mr EDITOR, —An opinion prevails amongst shipowners and masters generally, that vessels may be supplied with provisions, such as beef, bread, &c., from the government stores in the Island of Ascension. Such opinion, however, is contrary to fact; for on calling there on my passage home from Singapore, in July last, (1838,) Captain Evans (commandant) informed me, that 'only in cases of extreme want or distress, was any provision to be supplied to vessels calling there.' Nor is water to be had in such abundance as I was led to believe; one gallon, per man, per diem, allowing the passage from there to England to be 42 days, was all that could be spared to the *Trinculo*. Government has fixed the price of turtle at 50s., per large and small, which you will perceive is 20s. more than the price stated in page 299 of the second volume of the *Nautical Magazine*. Thus you see that there is no inducement to ship-masters to give the preference to Ascension over St. Helena. It is but justice to add, that the commandant and officers, at the former island, appear to be most anxious and willing to oblige those who call there, as far as their limited means will admit. Should you deem any part of the above worth inserting in the *Nautical Magazine*, for the information of my brother 'wanderers on the deep,' the majority of whom, perhaps, are not aware of the recent regulation, it will oblige.

Your obedient servant,

JAMES R. REA."

† This gentleman and several of his people fell a victim to fever, which broke out here in 1838.

always break upon this rock, but there is always a considerable swell passing over it.

Ships approaching Sandy Bay, from the western side of the island, must be careful not to advance nearer to the land than a mile and a half, until the houses and barracks be opened to the eastward of the fort. They may then stand into Sandy Bay to their own depths, free from all danger.

By attention to the above observations it will be impossible for ships to meet with accidents; for on all other parts of the island the coast is bold (north point excepted), and may be approached to within a cable's length."

REMARKS OF COMMANDER FISHBOURNE, H.M. STEAM-VESSEL ALBAN :—"Vessels steering for the anchorage of Ascension should haul round the north side of it, and keep at such a distance as to prevent being becalmed, until they open the anchorage, when they should keep close along shore. By this means they will fetch into a good berth without tacking. It is not advisable to bring Cross Hill, on which is the Semaphore, to the eastward of S.S.E. $\frac{1}{2}$ E.; for though you might do so, and be still clear of the foul ground, you would be within the influence of the rollers, which sometimes break a mile N.N.W. of the western extremity of the bay, roll over the foul ground, and so agitate the water, on the anchorage side, as to render it highly imprudent to allow of a loaded boat lying alongside.

Vessels making the land, towards nightfall, ought to keep well in by the north end of the island before dark, taking the bearing of the Three Sisters' Hill, easily known by there being four prominent stones on its summit. This hill has been mistaken for Cross Hill, and in consequence a very dangerous berth taken, which the vessel was obliged to weigh from immediately, and not without apprehension that a flaw might cast her on the rocks which were quite close. Having made the Sisters, stand on until Cross Hill opens, haul close along shore, without apprehension, till Cross Hill bears S.S.E., and anchor in 9 or 10 fathoms. Cross Hill, in the centre of the sandy bay, may be a better direction, as the difference of compasses may throw a vessel into a bad berth, from its proximity to the foul ground. Water is to be obtained readily here, and seldom without fail. Many vessels are supplied even when the rollers are in.

The rollers are said to be very capricious in their rise and progress; but this assertion, I think, will fall before continued observation; and my experience of eight months tends to show that they render to reason a sign of their coming, if not a solution of their cause. A distant ripple, extending itself to North-west from the extremes of land, was visible from any part of the bay or island, appearing to arise from the water outside of the island being higher than that within the bay.

This ripple was apparent from the middle of February to August, and of greatest amount in May and June, and seems to be the result of a N. N-westerly current, which runs during these months. This current divides at the southern extremity of the island, passing along either side, and forms the rollers which flow laterally into the several bays of the island, the southern extremity of each bay preventing a direct inflow. Thence the direction of the roller must depend upon the position of the bay, with respect to the current.

They commence, however, generally from a direction as far to the southward as the southern extreme of each bay will admit of; from which direction, subsiding as they alter their direction, or sweep round the point of the bay, they disappear about five points North of their first direction. They commence in February, and become more frequent and heavy in May and

June, after which they are less in size and frequency, and cease in September. I have been told that rollers come in from the north in December. This, however, is rare; but they are then quite as high, if not higher, than at any other period.

While I believe the direction to be correctly stated, I think the height exaggerated; it being estimated from the effect on the pier, which effect must always be greater, all other things equal, than from any other direction, on account of the more direct action, the pier being open most to waves from North to North-west, the foul ground breaking their force when from the westward.

The rollers were generally preceded by light and variable winds, and followed by an increase of trade-wind (considerable when the rollers were highest), and an extremely attenuated atmosphere, so transparent that the Green Mountain certainly appeared but half its distance from the anchorage, and this without any increase of moisture. Once there was considerable moisture; the mountain then appeared still nearer, and the rollers were accompanied, if not preceded, by rain. Attention to these indications enabled me to predict the coming rollers; and though I inferred corresponding barometric changes, I was not surprised at the apparently insufficient differences, on account of the many circumstances attending to vitiate the apparent unconnected, if not corrected, results. For instance, the mountain being on the weather side of the island, and the bay on the lee, the clouds, condensed by the mountain, pass over the bay in dense masses, assuming a singular constant triangular shape, during the afore-mentioned months, the apex of the triangle being in the North-west. Though the tide may be in some measure corrected; for when regular, its height is too irregularly modified by the rollers to admit of a correction. The concentrated heat in the bay, modified by the direction and force of the wind, producing a greater or less increase of elasticity, all tend to vitiate barometric results.

The following may go far to elucidate the causes of the above-mentioned effects. Lieut. Bold, in his *African Guide*, says, 'that the currents have Northing or Southing in proportion as the trades incline towards the tropics, and their velocity is increased by an increase of trade wind.' Now, such must be the case at this place, during the months of May, June, and July, when the South-east trade is extending its northern limit further to the northward, and will account for the strong ripple mentioned before; and also for the strong N.N.-westerly current, which we found in July to be running full 30 miles in 24 hours, in smooth weather, and must have been quite 35 miles during the stormy breezes which we experienced in June. Again: the height of the barometer in this latitude being less than it is to the southward, this last increased perhaps by more Southing being in the wind in May and June, together with the fact that the rarefaction of the air in the tropics (and being greatest here about May and June), produce an ascending, consequently relieving pressure current, and to the greatest amount during these months, will tend to induce a wave in this direction from the point of greatest pressure, which must be from the south, while the sun is so far north of this latitude; and from the high barometric state, together with the descent of the superior return current in the southern latitudes, we may infer a wave will be propagated in the direction of the point of least pressure, which will be generally to the northward in this hemisphere, but I presume must be so during the months of May and June.

If this implied want of hydrostatic equilibrium be correct, it ought to be greatest, or at least produce greatest effects on the winds, currents, and rollers, in the months of May and June. I find, on reference to the log, that the

winds were of greatest force during the last days of April, but still strong through May and June. The *Edward*, of Shields, arrived here, having experienced strong winds in May; and H.M. ships *Fawn*, *Prompt*, and *Rolla* arrived here early in June, having had to contend with strong southerly winds, with a northerly current; and referring to the remarks in the meteorological table, I find that the rollers were heavy, and most continuous in May and June.

To account for the change of direction in the rollers as they pass to their subsidence, I can well imagine that, as the equilibrium is in process of restoration, the currents of air and water will decrease in velocity, the wave also will decrease and alter its direction, till even re-action may produce almost an opposite direction, in which cases it must roll into bays open to the north-west. The anchorage here, and at St. Helena, being on the north-west side of the islands, may account for the rollers being said to come from the north-west; and it is probable that they are highest at the anchorages, from their being to leeward. The period when the rollers are said to come in from the northward being in December, at which time the sun is in high south declination, it is not improbable, I think, that the pressure may be greater to the northward than here, and hence propagate a wave in this direction. There is a singular, and, as I am told, regular process observable here; and it appears consequent upon the rollers or their causes, which is a beautiful illustration of a nice adaptation of a universal law to individual habitudes, and another of the many proofs of design with which earth, air, and ocean are strewed, bespeaking a Creator, lavish in greatness, supplying all our real wants, and bounteous in goodness and truth.

The selvage of sand round the bays where the turtle lay their eggs, is increased considerably in breadth during the season of incubation. In this process of extension it becomes shelving and easy of access, after which it appears too narrow to its original dimensions, and becomes precipitous, thus affording additional space and facility of gaining it.

Of the many vessels which arrived at Ascension from England, one only made a really good passage, owing to their going by the western route, or in consequence of standing over to the African shore, supposing, no doubt, that they would not otherwise fetch Ascension.

The course I should recommend, is to pass sufficiently far to the westward of the Cape de Verds, and continue till to the southward of their influence in order to avoid the calms, with rain in squalls which generally obtain under their lee. Then shape a course for 16° on the equator. This will bring you soon into the south-west wind, which obtains generally throughout the year, and which will enable you to make southing to get out of the easterly current, the limits in latitude of which vary from the equator to 2° North. A westerly current obtains to the southward of this, and within narrow limits. Should you have not crossed the line before coming to 8° longitude, go about, if you can make a west course by compass on the port tack, from which you will fetch Ascension as you come up, on drawing out from the African coast.

Several steamers have taken the eastern passage to the Cape of Good Hope, erroneously considering that they will invariably have land and sea breezes to aid them to the southward, and that they will be enabled to get fuel not only in sufficient quantity but with facility. The green wood which is to be had is a very insufficient fuel for obtaining full steam, and even this is not to be procured without delay. It is better far to coal at Ascension, but even this delay may be avoided by husbanding fuel on the passage from England.

For instance, let a vessel leave England with 14 days' coal on board, and

have also the ordinary amount of sail that our men-of-war steamers have, such as the *Vixen*; then working expansively, and taking advantage of the winds, she need not expend more than 7 days' coal before she arrives to the south-east trade, from which she must sail with one engine going to the southern limits, which may thus be reached by vessels such as the *Vixen* in 8 or 9 days, and the westerly winds may be reached in one day more, having expended then from 12 to 13 days' coal. These westerly winds will run her to the Cape in 8 or 9 days, or even to a position to fetch Mauritius with the south-east trade in 5 days more. If she be bound to China this would be advisable, though in following this route she may have gone much to the southward of her direct course to the Cape, she will yet have attained to a latitude in which the degrees of longitude are so short as nearly to compensate for that but apparent great difference. Now, let it be supposed that the same vessel shall have gone to Ascension with only the same consumption of coals, or two days at least more. If she objects to make the detour necessary to fetch it under sail, this she cannot effect under 2 to 6 days more time. She will not then complete her coals, in the first case under 6 days, and in the second case under 8 days. She will not then reach the Cape of Good Hope, if she steer direct, in 14 days' time, and may be blown off by a south-easter, and then have to stand to the southward under sail, her coals being expended; while, if she shape her course to the southward of a great sailing course, as far as may be, without increasing her distance above that of a direct course distance, she will have arrived in the westerly winds, which will run her into the Cape, so as to insure fetching, though a south-easter should catch her, and this in about 15 days, perhaps with a saving of 1 or 2 days' coals, which are valuable to contend with any unforeseen difficulties which might occur. For instance they might enable her to steam in against a north-wester. Then suppose a similar vessel to make the eastern passage, and to complete her coals at Fernando l'o: she will not arrive at this place till 6 days, at least, after another may have reached the northern limit of the south-east trade; she will then require 6 days to complete her coals;—she will not then reach the Cape, husbanding her coals as she may, under 20 days, for which she must have 18 days' fuel. If she stop anywhere to obtain the 4 days above her ordinary quantity, it will occupy fully 8 days, if not 8 days will not be more than enough to allow for completing the passage under sail."

REPORTED DANGER TO THE N.E. OF ASCENSION.—EXTRACT FROM THE NAUTICAL MAGAZINE FOR 1832, PAGE 561.—"On the authority of Commodore Hayes, and Mr. A. Weir, the master of H.M.S. *Dryad*, we can no longer give credit to the statement of Mr. Fraser, of the ship *St. George*, in 1830, relating to the existence of a dangerous rock to N.E. of Ascension. By the following it will be seen, that the *Dryad* and her tender went in search of it; and from the care taken in the observations, as well as the common occurrence of shoals of fish being frequently seen in those latitudes, and the great probability that it would have been discovered before, had such a rock existed, we must conclude that there is no such danger.

The master of the ship *St. George*, on her passage to the Island of Ascension, in the employ of government, on the 14th October, 1830, having reported the existence of an extensive danger, in latitude $6^{\circ} 35' S.$, longitude $12^{\circ} 57' W.$, and left with the commandant of Ascension an extract from his log, relative thereto, H.M.S. *Dryad*, accompanied by her tender, sailed from that island on the 14th January, 1832, to search for, and, if possible, give so dangerous a shoal a positive position. On the following day, at 11 a.m., the *Dryad* was upon the exact spot, the tender bearing N.W. 4 or 5 miles, the

day very fine and clear, a five or six-knot breeze by the wind, and sufficient swell to break upon a shoal; nothing, however, indicating the existence of a shoal could be detected."

12. **ST. HELENA** is a small rocky island about 1200 miles west of the coast of Benguela, in South Africa, and nearly in the latitude of Cape Negro, and about 1800 miles east of the coast of Brazil, in South America.

It was discovered on the 15th of August, 1502, by Joao da Nova Galego, a Portuguese navigator, on his return from the East Indies. This discovery happened on the anniversary of the festival of St. Helena; so he called the island by her name. It has been uninterruptedly in the hands of the English ever since the year 1674; and its situation and supply of pure fresh water have gained for it the notice and patronage of the East India Company. St. Helena will attract particular notice to the end of time, as the sequestered spot to which the late Emperor Napoleon Bonaparte was consigned as an exile.* Seen at a distance the island appears like a lofty mass of barren rocks, rising in a pyramidal form; on a nearer approach, rugged and almost perpendicular cliffs, from 600 to 1200 feet high, are seen encompassing the island all round, broken through in several places by deep chasms, which open to the sea-shore, and which form so many narrow valleys, winding up the table land in the centre of the island.

One of the principal of these openings is named James' Valley, on the north-west coast of the island; and at the opening of it to the sea is James' Town, the only town and port of the island, which is defended by strong batteries, and is the residence of the authorities. Ascending James' Valley we arrive at the plain of Long Wood, situated in the eastern part of the island, and consisting of 1500 acres of fine land, nearly 2000 feet above the sea, sloping gently towards the S.E. In the centre of the island rises Diana's Peak, 2693 feet above the sea. A calcareous ridge, which runs across from east to west, sloping abruptly on the south, divides the island into two unequal parts; the larger and finer of which is on the north side of it, containing James' Valley, Rupert's Valley, Long Wood Plain, the deep crater-like dell named the Devil's Punch-bowl, the Briars, near which is a fine cascade. Plantation House, which is a country residence of the governor, &c. The whole circumference of the island is about 28 miles.

The population, exclusive of the garrison, is about 5000, about one-third of which are Europeans, and the rest are blacks, men of colour, and Chinese. The climate of St. Helena is one of the healthiest under the tropics, and is found beneficial to invalids from India, and even from Europe. The range of the thermometer, at Plantation House, is from 61° to 73° within doors; it sometimes falls to 52° in the open air, between June and September. In James Town it is generally from 5 to 7 degrees higher than at Plantation House, and at Long Wood it is somewhat lower. The summer rains fall in January or February, and the winter rains in July or August. Cloudy days are frequent and refreshing throughout the year. Viewed from the sea the island appears barren, but the interior is covered with a rich verdure, and is watered by abundant springs; the soil of the valleys is very rich, and produces all the fruits and flowers of Europe and Asia. Horned cattle, sheep, and goats feed on the rich pastures. Pretty cottages, in picturesque situations, are scattered about the island. The base of the island appears to be basalt, and lava and scorix are found scattered about the surface.

The only *landing-places* are at Rupert's and James' or Chapel Valleys. In Rupert's Valley, toward the sea, stands a strong battery, well mounted with

* His body was removed to France on the 18th of October, 1840.

heavy cannon ; but the valley is not habitable, because it has no water. In the entrance of James' Valley stands James' Town, which is defended by a very fine line of 32-pounders, and flanked by a high inaccessible battery upon the rocks, named Munden's, close under which all ships must pass that come to anchor before the town. The water that supplies the garrison and shipping is conveyed by leaden pipes from a spring in the valley distant more than a mile from the sea. These pipes lead the water to the jetty, where there are two cranes for the use of boats, in loading with goods or water-casks, or for receiving stores from the shipping. The water is of the purest quality, and in great plenty. In a moderate season, six hogsheads are yielded every minute, and shipping may be supplied with 300 tons every twenty-four hours. On the right or western side, the valley is entered from the interior by the steep promontory named Ladder Hill ; the zig-zag road, upon which (9 feet in breadth) is a wall on the side next to the precipice, and is very easy of ascent. On the left of the valley, the carriage-road, named Side Path, is the avenue to the interior of the island eastward.

On the ridge above Ladder Hill, is the Observatory, now no longer in use, as the time ball, which was originally hoisted here, is removed to the town, and is in charge of the master-attendant, whose attention to it is unremitting. The ball drops at mean noon, St Helena time, for the benefit of the inhabitants, and at one p.m. for the advantage of the shipping. The ball is hoisted half-mast high, five minutes before the time, and at one minute before, to the mast-head.

The following official notice, dated St. Helena, 21st January, 1834, states that, " To prevent mistakes, a white ball, hoisted upon a staff, will denote the time as follows : the ball will be hoisted half-mast at five minutes, and close up at two minutes, before twelve o'clock. At the instant of the mean time, at noon, of St. Helena, the ball will drop from the top of the staff, when the gun will be fired at High Knoll. The signal will be repeated at one o'clock, at the instant of Greenwich mean time, for the benefit of the shipping. A ship wishing to correct her chronometers, and arriving after one p.m., and not likely to remain the twenty-four hours, may hoist the Blue Peter at the main-top-gallantmast head, when the same method will be adopted at the next ensuing hour after the signal. Foreign ships to substitute their ensign for the Blue Peter.

Should there be any uncertainty, and the ship wishes to have the signal repeated, she will dip the flag, and re-hoist it on observing the ball half-mast. The ball will again drop at the ensuing quarter of the last hour. Ships concealed from a view of the signal station will attend to the Repeating Ball at Ladder Hill, and in neither case is any allowance to be made for loss of time, since the astronomer will make the calculation of the few tenths required.

All ships in approaching the island must heave-to, before they can pass Sugar-loaf Point, and send a boat with an officer to report them ; the boat is generally hailed from the battery at the point, but she must proceed to James' Town, to give information to the governor, before the ship will be permitted to pass the first battery of the Sugar-loaf. Ships-of-war, as well as others, must observe this precaution, or the batteries will open and prevent them from gaining the anchorage. When the boat is perceived returning, the ship may make sail ; and after passing Sugar-loaf Point, within a cables' length or less, keep the shore close on board, in passing Rupert's Valley, with the head-sails braced well forward, to prevent them from being taken back by the gusts of wind that blow from the high land, which frequently veer several points. Having passed Rupert's Valley, you should keep near to

Munden's Point, but take special care to avoid the sunken rock which lies off the fort, at between 30 and 40 yards from the point; upon this rock a small buoy with a red flag is placed.

When you are beyond Munden's Point, you will perceive James' Town and valley, off which is good anchorage, with from 8 to 15 fathoms water—bringing the flag-staff on the fort, in James' Town, to bear S.S.E. or S.E. by S., and Sugar-loaf Point N.E. by E., distant half a mile from shore. There is also good riding abreast of Ladder Hill, or off its eastern point, having the the flag-staff E.S.E., and about 14 fathoms water. You should moor with a stream or kedge-anchor to seaward, on account of the eddy winds which commonly prevail, particularly near Ladder Hill. Those anchoring in the stream of the valley seldom swing toward the shore, for a constant breeze, and frequently gusts of wind, blow from the valley to seaward; with light winds, the vessel will, at times, swing alternately to the eastward and westward, which is occasioned by a sort of tide or current; but this current is very weak, and at full and change of the moon the rise of water is seldom more than 2 or 3 feet.

The bank of soundings begins off Rupert's Valley, and extends along the N.W. side of the island, so far as the S.W. extremity, or Horse-pasture point; but there are no soundings to the eastward of Sugar-loaf Point, except close to the cliffs.

Sperry Ledge is a reef, two cables' length, with depths of 16 to 10 fathoms; and pointed rocks, of 24 to 18 feet, between it and the south point of the island, from which it is distant better than a mile S. by W. (*true.*) This is the only danger at any considerable distance off the island, and it is not in the way of ships, unless they fall to leeward and round the south point; in such cases, they should give it a berth of 2 miles, till it bear about N.E., then haul up for the S.W. or W. point, which is bold to approach.

Barn Ledge is about $1\frac{1}{4}$ cable's length in circuit, with 12, 8, and 6 fathoms on it, to $3\frac{1}{4}$ fathoms, sharp rocks, on the shoalest parts. Barn Point bears from it N.W. $\frac{1}{4}$ N., distant about three-quarters of a mile, and there is 24 or 20 fathoms between it and the shore, with 32 fathoms near it on the outside. Large ships coming from S.E. should keep the small islet, named George's Island, well open with Saddle Point, until Sugar-loaf Point is open with Barn Point, which will carry them clear outside of the ledge; or keep a mile from the shore till nearly abreast of Barn Point which is the N.E. point of the island.

About 2 miles to the S.W. of James' Valley is Lemon Valley, where there is a run of good water, but too difficult to come at, on account of the surf which beats against a rocky shore. Vessels do not often anchor here, being too far from the town; but they frequently ride off Rupert's Valley, though the ground is not so good as it is abreast of James' Valley and Ladder Hill; here the soundings extend about 1 mile from the land, sinking suddenly from 40 fathoms to no ground; ships, therefore, should not anchor too far out, near the edge of the bank in deep water, for the gusts of wind which come from the valley will start your anchor, and to let go another will be unavailing, as, from a sudden declivity of the bank, it will not reach the ground. Should a vessel anchor in 35 or 40 fathoms, and the anchor not hold, all the cable may be veered out, to make her ride, until it may be convenient to warp farther in; but you should never let go a second anchor, for if she will not ride safe with one, it ought to be hove up, and you should work in by short tacks, under the lee of the island, until you gain a better anchorage.

VESSELS BOUND TO ST. HELENA, after crossing the equator, generally stand to the southward as far as $29^{\circ} 30' S.$, or even 31° if necessary, until they get

variable winds, with which they run down their easting, and then stand to the northward, into the S.E. trade, for the island. Some few ships have found the trade-wind vary so much that they have never gone to the southward of 20° , but, availing themselves of the changes, have tacked as the wind varied, and worked up to the island, between it and the parallel of 15° S.,—but this has seldom happened.

During the months of November, December, January, February, and March. if, on crossing the equator, a ship finds the wind incline from S.W., she may, by standing S.E. across the Gulf of Guinea. close on a wind, and afterwards tacking as it veers to the east or west of South, most probably reach St. Helena in less time than if she had proceeded by the former, or western route. But when the sun has great north declination, this eastern route seems precarious, while the other is certain at all times. Although it has been the practice of ships going the western route, to run so far as 32° and 33° S., yet it can seldom be requisite so to do, as it lengthens the passage: those ships which have not proceeded so far south, have generally made the best passage to St. Helena. From the time of losing the N.E. trade-wind; forty or forty-four days may be considered a fair passage, by the eastern route, in the above months. From the same limit, forty-three days may be considered a medium passage, by the western route; and during any months in the year, it may be made in this time. From St. Helena to the Cape, a month is considered a fair passage.

Captain F. Fokkens (Mercantile Marine) thus describes a visit to St. Helena:—

“ St. Helena is situated within the borders, and in the heart of the south-east trades, appears on every side a barren and unapproachable rock, which, with naked walls rises abruptly from the ocean. The whole mass is a collection of deep vallies, chasms, steep mountain-ridges, and peaks, the highest of which latter are named Diana Peak, Cuckold Point, and Hally Hill, (respectively 2692, 2672, and 2467 English feet above the level of the sea,) occasionally hiding thir green summits in the clouds.

No coast in the world presents such a chilling appearance as St. Helena, with its steep and cloven crags, its barren rocky ridges, and fearful fissures, and no one beholding this forbidding coast, can imagine that the island contains so much beautiful scenery. St. Helena is in some degree oblong, almost a square, extending E.N.E., and W.S.W., and is about 9 miles long, and 26 miles in circumference. James Town, the only one, is on the north side of the island, off which vessels anchor, protected by the land from the violence of the south-east trade. Westerly or northerly winds seldom blow with force or duration, so as to endanger the shipping in the road.

Off the north-east end of the island are two pointed rocks standing high out of the water, the outermost of which is named George Island, and the inner one the Column of Hercules. Close off the southern cape are three craggy rocks named the “Needles,” and a little to the northward of the western point of the land close to the shore are two more named Bird or Egg Islands; they are all barren rocks, the largest of which is not more than 300 ells in circumference.

Approaching the island from the south-east, the land appears to slope gradually from the middle of it to the northward, terminating abruptly in Barn Point, 2272 feet high. Beyond this Sugar-loaf Point is seen, the northern extreme of the island, and near which is the well known pinnacle-shaped mountain, named the Sugar-loaf, 1960 feet above the sea. At the foot of this mountain are three batteries, a short distance from each other, named Buttermilk, Above Bank, and Beneath Bank Batteries, mounted with heavy guns,

about 100 and 200 feet above the sea. and which, with the others, would be formidable to an enemy. Ship-masters must be careful not to go to leeward of the road, but to make the island from the eastward, keeping Sugar-loaf Point, when rounding it, close on board.

Formerly all vessels on passing this point, sent a boat to the first-named battery to give the name of the ship and the object of her visit; but of late years this practice has been discontinued. On that account our seamen gave it the name of "Pry Corner." About half a mile south-west of this point is Munden Point, which forms the eastern boundary of a bay in which, at the entrance of a small valley, James Town is situated; the best anchorage off it is in from 12 to 20 fathoms. The western point of the bay is formed by a steep perpendicular hill named "Ladder Hill," about 800 feet above the sea. The distance between these two points is about 3 cables' length. Between "Pry Corner" and "Munden Point" is Rupert Valley, where landing can be effected; but commanded by a strong battery.

James Town and the Road are defended in front by a strong stone-wall, on which are placed some 32-pound guns and heavy mortars, separated from the landing-place by a deep moat; on the west side they are protected by a strong battery on the flat crown of the projecting corner of Ladder Hill, and on the east side, in addition to the above, by a strong fort on Munden Point. As soon as Munden Point is passed James Town appears suddenly between rocky precipices 1000 feet high. The white buildings and church, with the green foliage of the neighbourhood, give a pleasing effect to the scene, improved by the contrast of the adjacent crags. Immediately behind the water battery, and in front of the town stands the castle, a very large building, distinguished by a flag-staff, and near to it, on the right hand, is another large house named the "Times Office" (deriving its name perhaps, from the duty assigned to it of giving time to the ships).

In the first are the offices of the government officials, the other is the dwelling of the harbour-master. The Times Office is provided with a mast, from which at a stated time, a white time-ball falls in sight of all the vessels in the roadstead. The duty of regulating this belongs to the harbour-master, and affords an excellent means for regulating chronometers. In the distant extreme of the valley, on one of the highest rocky points, a large handsome white building may be seen in the midst of a grove, belonging to Mr. Young, collector of excise and customs duties. To the right of the valley is the ladder or staircase which is the ascent to the top of Ladder Hill; farther inland is the elevated well-known mountain "High Knoll," 1900 feet above the sea, having a telegraph on the summit of it; and to the left, at a short distance from the anchorage is the landing-place.

The town consists of one street only, the houses standing lengthwise in the valley, completely surrounded by farm yards. The landing, which is not very easy, is on a steep projecting rock, in which steps have been cut, and bricked, and against which the swell is so high at times, that caution must be used to spring out of the boat as it reaches one of the highest steps. A couple of hundred paces more inland, on the same rock, is a second landing-place and ladder, which is used when there is too much sea on the former.

The way leading from the landing-place to the town-gate, is partly hewn out of the rock. The stranger has no sooner landed than he is struck with the awful grandeur of the massive rocks rising nearly perpendicular above him on his left, towering over some small houses. About 500 or 600 paces from the landing is a drawbridge, where the Toll-house is situated, and where is placed a neatly dressed sentinel in English uniform, white trowsers, red coat, &c. Should you have luggage it is inspected here; the gentlemen who

perform that office are very civil. Having crossed the bridge, the water battery is on the right, and on the left the town wall, before which are some wooden houses behind a row of trees, in the midst of which stands the custom-house, containing the offices of the collector and other officials.

At this place vessels are cleared in and out, goods deposited, &c.; about 200 steps further, nearly under the Times Office, is the gate which leads to James Town. Passing the gate the visitor sees an extensive rising plain before him, higher up terminating in a street, while to the right, immediately behind it, is the before-mentioned ladder of 668 steps.

Near the main-guard is an inn, called the St. Helena Hotel, and hard by the Episcopal Church, beyond which on the left, at the entrance of the gate, are the Town Hall, Court of Justice, and Library, and the Government Gardens, tastefully laid out, and enclosed by an iron railing, and all forming an evening promenade.

The street which, with this plain forms the aforesaid part of the town, is broad, and has on each side a dozen neatly-built stone houses, with two others standing crossways higher up, branching in two directions, the one on the left side, leading through a small street, is the way to Napoleon's grave at Longwood, while the other side forms a street which leads to the highest part of the valley, where are situated the parade-ground, the botanical gardens, and the hospital. In front is the market-place and two shops, while further up are several public-houses, &c. The houses here are not so well built as in the lower part of the town, and characters of all descriptions are to be met with both in the upper and lower parts.

Along the foot of the ladder is a way behind the houses, by which in a zig-zag direction cut out of Ladder Hill, the visitor reaches the summit, and thence Plantation House. This path is 9 feet broad, protected by a wall four or five feet high along the steep abyss. It is easy of access both for carriages and foot passengers, but presents a fearful and terrific appearance from immense crags overhanging and threatening every minute to fall and crush everything beneath them. The road on the left side, leading to Napoleon's grave, is also cut zig-zag out of the steep rock called Rupert's Hill, this is also protected by a wall, and is very easy for passengers.

The lower strata of the island is mostly of a dark brown colour and has every appearance of volcanic formation; a rich and productive soil of from 6 to 12 inches deep constitutes a portion of the island, and produces amidst the dales and valleys a diversity of herbage of the most beautiful colours, while on the higher parts of the island are various trees of which the fir forms the principal. A stunted sort of fir called the gum tree thrives very much, and on the south-west part of the island there is a forest of these trees. The oak is also found here; it shuts up suddenly but never reaches its natural growth.

The open plains are mostly converted into grazing lands and corn-fields, and gardens for vegetables, most of which fetch a good price in the market. The sugar cane, indigo plant, cotton and coffee trees, have been introduced into the island, and would have flourished very well, but are little cultivated, the farmer confining himself more to the growth of the necessaries of life, for which he can find a daily sale in the market. Quinces, pisang, aniseed, grapes, and pears, together with a variety of other fruits are found here. Apples and more particularly pear-trees are in abundance. Near to the south-east part of the island is a valley through which flows a stream, the banks of which are completely covered with this fruit over-laden nearly to the ground.

The high ground of this orchard is darkish clay, several feet deep. Wheat,

barley, and oats, flourish well, but the hopes of the farmer for a good harvest are often blighted by drought, and also by his greatest enemy the rat, which sometimes appears in innumerable quantities, and destroys whole fields of wheat. Potatoes, cabbage, turnips, onions, celery, and other vegetables are plentiful, besides peas and beans in variety, a mixture of all of which is daily brought into the market. Potatoes form a staple produce of the island; they are of a very fine description, and three crops are gathered during the year, and in favourable seasons 6000 bushels are annually sold. Cattle, sheep, and pigs thrive well at St. Helena, but other European animals, from the change of climate are not numerous. There is also a handsome and strong horse of English breed; oxen are also of English breed. Of poisonous animals there are no others than the scorpion and the centipede, their bite is not so dangerous as those of India. In general, very few birds or beasts of prey, spiders, caterpillars, musk rats, nor anything of the sort are met with; but whole hosts of rats, as before mentioned, infest the island. Pheasants and partridges are abundant, and gardens and orchards are enlivened by the notes of canaries. The feathered tribe of all sorts abound, besides myriads of rabbits.

A great variety of fish are caught round the island, of which the mackerel is the principal, quantities of which are taken daily and brought to market. There are the albicore, silver fish, bream, old-wires, conger eels, &c., and a fish which on account of its red colour is called the "soldier." Turtle are caught from February to June. In shell fish there are a variety of crabs, some of which are very good.

The sea birds lay their eggs in the clefts of the rocks, and are used by the inhabitants as an article of food.

The water is very pure and good, and kept in large quantities. It is reckoned that every minute nearly 1,400 cans are received, whereby 300,000 can be supplied daily to the shipping. It is carried on board by vessels, from whence it is pumped out into the tanks on board and done very speedily.

The Rollers at St. Helena.—As at Ascension and other places, there is sometimes a tempestuous sea on the shore, that precludes all possible communication between the vessels and the land. The English call it, "*the Rollers.*" The prevailing months are from December to April, though they happen also at other times.

I experienced them as I lay in St. Helena roads and can bear witness that they form one of the grandest sights that I ever saw. A slow, high, rolling wave rises in the north-west, flowing towards the island, and before any precaution can be taken breaks upon the shore with a heavy surf. The atmosphere is bright and clear, the barometer remains as ordinarily, and the sea smooth in the distance, the waves being scarcely ruffled by a cat's paw. In an instant, all is confusion around, from a sudden, upheaving wave rolling onwards and breaking on the outer shallows with tremendous force. Instantly the surf follows, one wave succeeded by another with redoubled force towards the shore, breaking upon the rocks. The landing then is very dangerous, and all plying between the harbour and shore is stopped. The rollers or extraordinary high swells first appear in the form of a high, steep, long mountain ridge, and gather fresh strength as they approach, astonishing the beholder; water mountains seem to follow each other with redoubled violence until they reach the receding waters from the shore, meeting them as walls, and with irresistible fury dash over the beach. The shore is a mass of foam, while the houses in the town are shaken almost to their foundations. Such was the case in 1838, while I was on board the *Elizabeth*, and when the spoon drift came flying over Mr Solomon's house like a shower of salt

water. At the same time all was under water on the weather side, and every now and then the rollers swept over the landing place to such a height, that the force of them drew the heavy crane, used for unloading and loading vessels, about like a weather-cock. A few years subsequently, I lay there in the *Mendoza*, and had an opportunity before I arrived on board of witnessing a similar scene. The vessels were riding at anchor with a light but high running swell, which a few cables' lengths off the heaviest hurricane seemed to rage, presenting a terrific appearance.

The most striking scene was the mountain of waters rolling in with speed against the wind, their towering tops curling into foam like white feathers and plumes shining through the light, carried about in all directions, forming a dancing mass above the scene, while the sun's rays shining through them depicted all the colours of the rainbow. In Feb., 1846, there was a similar visitation, attended with much damage, when many of the condemned slave vessels were stranded and lost. The landing-place and crane were washed away, the iron water reservoirs and their small houses totally destroyed, the damage done in the island was estimated about £20,000. Vessels that were at anchor in the roadstead outside the 12 fathoms depth escaped unhurt, and their crews were spectators of this vast scene of devastation. The wind for several days before this disaster was from the north-west with thick showery weather."

13. **BANK OF ANTONIO VIANA.**—This bank, according to "Pimental," lies between the 17° and 18° of South latitude, about 70 or 80 leagues W.S.W. from Cape Negro. It is considered very dangerous to ships coming from Brazil to Benguela and Angola; one of the rocks only appears above water. The shoal is very steep, and cannot be discerned in the day-time till you are near, on account of the foaming of the sea, the noise of which may be heard at a great distance, and may warn you of the danger in approaching it during the night.

14. **MARTIN VAS ROCKS.**—These are three high and barren islets or rocks, of which the central one is the largest, and may be seen at the distance of 8 or 10 leagues from a ship's deck. This is a little more easterly than the other two, although they are nearly on the same meridian, as they are all in one, when bearing north or south. The northernmost and central rocks are near each other, but between the latter and the southernmost is a channel. They are all steep and inaccessible, and the distance between the two extreme ones is about 3 miles; when seen at a distance they appear like five heads of land.

The following particulars, relative to a sunken rock near the Martin Vas Rocks, are by Capt. Menkman of the ship *de Amstel*, who says:—"At 10 a.m., on the 11th of May, 1842, we saw the Martin Vas Rocks bearing S.S.W., at noon they bore S.W. by W. distant 12 miles. At 2½ p.m. they bore South, distant 2 miles, and we discovered a sunken rock, nearly a mile S.W. from the rocks. Var. 6° West.

15. **CONGRESS BANK.**—A bank of soundings, coral or rocky bottom, of 35 fathoms, is said to have been found by the American frigate *Congress*, on her voyage to Buenos Ayres, in the latitude and longitude stated in the Table, (page 431.)

16. **ISLE OF TRINIDAD.**—This island is about 6 miles in circumference, and appears high and uneven, is distinctly seen in clear weather from the Rocks of Martin Vas, and may be perceived from a ship's deck at the distance of 12 or 15 leagues. It extends nearly S.E. and N.W., is generally rocky and barren, though in some parts there are trees of 18 in

diameter, particularly about the south part of the island. The shore is surrounded with sharp, rugged, coral rocks, and of difficult access, occasioned by the high surf that continually breaks on it in every part.

The fresh water is good, and supplied by two small streams, which run down the E. and S.W. sides of the island; it may also be procured at times from the rock which forms the S.W. extremity, but neither of them will fill a tube of 6 inches diameter, and it is doubtful whether these streams are temporary or perennial. Ships should not stop here for water, unless they are greatly in want of that article, for the difficulty of getting it from shore is great, and often impracticable; the anchorage is also unsafe, as the winds are variable, and should a gale happen from W. or S.W., they would be in great danger of driving on shore.

The best anchorage for those who are obliged to stop here to procure water, is about a mile off the west end of the island, that they may be able to clear it on either tack, should the wind shift and blow on; here they will have from 30 to 40 fathoms water, on coarse sandy bottom. Within a musket-shot of the shore are 16 or 18 fathoms, but it is not safe to lie so near. On the western side, nearly detached from the island, there is a rock 800 feet high, with trees upon it, called the Monument, or Nine-Pin. There is also a stupendous arch, which is perforated through a bluff rock, about 800 feet high; the arch is about 40 feet in breadth, 50 feet in height, and 420 feet in length. The sea breaks through it with a great noise, and there are more than 3 fathoms water under it. When the sea is moderate, you may see through this arch into the only bay in the island, and have a view of a distant rock, covered with trees. At the S.E. end of the island there is also a rock of a conical form, about 1,160 feet high, with trees likewise on its summit, named the Sugar-loaf; and whenever it rains hard a beautiful cascade of above 700 feet is projected from it.

Although Trinidad is within the southern tropic, the S.E. trade wind is not regular; N.E. and Northerly winds often happen, particularly the former. Sometimes light airs and calms succeed the S.E. winds; and sometimes hard squalls or S.W. gales have been experienced, which render the anchorage very hazardous. Trinidad is often seen by ships passing to the southward through the S.E. trade-wind, but is seldom visited, on account of its unsafe anchorage.

The latitude of this isle is $20^{\circ} 31'$, and the longitude of its south point according to Commodore Owen, by run from Port Praya, St. Iago, in 1822, is $29^{\circ} 21' 42''$.

17. THE ISLAND ASCENSAO is said to lie midway between Trinidad and the main, and thus described:—It is stated to be high, having a cove on its north side, with fresh water; off its western side are five small islands or rocks, one of which, stretching out to seaward, appears like a ship under sail. Fish and wild fowl are there in abundance. In this situation it has been repeatedly sought for in vain, and, therefore, modern navigators deny its position, and seem to doubt its existence. Notwithstanding this, it has been said, that land was seen by the Commander of the *Telica*, steamer, on her passage to Peru, in 1825, which appeared to lie in latitude $20^{\circ} 35' S.$, and longitude $37^{\circ} 8' W.$, or nearly so. The island bore S.E. by E. $\frac{1}{4}$ E., by compass, distant by estimation about 8 leagues. But this we must consider doubtful.

18. COLUMBUS, OR SAXEMBURGH ISLAND.—This island is stated to be about 4 leagues long, running from N.W. to S.E., and $2\frac{1}{2}$ miles broad, its N.W. point appearing to be a high bluff perpendicular promon-

tory, running off to the S.E. Several trees are said to be upon the island, which is said to have a sandy kind of beach; but its existence is considered more than doubtful.

19. GRANT'S BREAKERS.—The position of this danger is extremely vague. It is said to have been seen by Captain Grant, in 1800, who observed high and dangerous breakers, 32 miles S.E. $\frac{1}{2}$ S. by compass of latitude $31^{\circ} 13' S.$, longitude by account $11^{\circ} 48' W.$; he considered them the same as seen by a former vessel, who placed their situation in latitude $31^{\circ} S.$, longitude $21^{\circ} 45' W$

20. LAUREL SHOAL.—Captain McDonald, of the Laurel, bound from London to Valparaiso, in 1822, and touching at the River Plate, says, he discovered a shoal in the latitude stated in the Table (page 431). It appeared about a mile in length, and the same in breadth, having a sea breaking very high over it; it had the appearance of sand, and seemed very shallow. He passed within half a mile of it; then hove-to, and sounded with 90 fathoms, but found no bottom.

21. TRISTA D' ACUNHA.—This group consists of three islands, the largest and north-easternmost being named after the discoverer, Tristan d' Acunha; it is about 30 miles in circumference, and of circular form, being the base of a mountain which terminates in a peak, 8,326 feet above the sea, which may be seen at 25 or 30 leagues distance, and is sometimes covered with snow, when the sun is in the northern hemisphere. There is a considerable space of level land, fit for cultivation, between the shore and the foot of the mountain: the soil is rich, deep, and adequate to the production of all kinds of vegetables, &c. There is said to be shallow water and breakers extending full two cables' length from the west point of the island; at other parts the shore is bold-to, but modern accounts state it to be free from rocks or dangers of any kind. At the north side of the island, the land rises perpendicularly upwards of 300 yards, whence it ascends with a gentle acclivity to the base of the peaked mountain, which rises majestically over the table land. There is a bay on the north-west side of the island, with a beach of black sand, where boats may be hauled up; the bay, however, is open and much exposed. Here is an abundance of good water, falling from two cascades; one of them is so conveniently situated, that the water may be conveyed into the casks in the boats by means of a long hose. Around this bay is plenty of wood, but the trees are small, and of the maple kind, burning remarkably well; and on the east side of the island is commonly a quantity of drift wood, but never any on the western side. The shores abound with wild celery, dorrel, and parsley; and there are numbers of wild goats and hogs, but apparently no other quadruped; large quantities of various fish frequent the surrounding sea, and the shores are covered with seals, sea lions, and sea elephants; whales also, of the female or cow kind, abound in the offing.

22. INACCESSIBLE ISLAND lies nearly W.S.W., by compass, from the northern island, and is 9 leagues distant. The Blenden Hall, Captain Greig, on her voyage from London to Bombay, in 1821, was totally lost on Inaccessible Island, and eight of the crew perished. The island is about 9 miles long, well wooded, and remarkably high, so much so, that it is a day's work to attain the summit; it is constantly enveloped with clouds, and visited with squalls; it has no harbour or cove, and can be landed on to leeward only,—a heavy swell constantly prevails. NIGHTINGALE ISLAND bears S. $33^{\circ} W.$ distant 8 leagues from Tristan d' Acunha. The three isles are high, rocky, and steep-to; off the south end of the smallest island a reef of rocks

runs out a considerable way, but no other danger is known about them; there is no safe anchorage, but deep water channels between them all.

REMARKS BY JAMES HERD, COMMANDER OF THE BARQUE ROSANNA.—*Nautical Magazine*, for 1832, page 340.—“The latitude of ‘Tristan d’Acunha’ was ascertained by observations taken on shore, by the artificial horizon, as was likewise the time for chronometers, within one hundred yards of Cascade Point. From this point Inaccessible Island bears, by compass, S. 63° W., distant 20 to 21 miles; from the S.W. point of Tristan Island, Nightingale Island bears S. 28° W.; from Cascade Point to the S.W. point, the coast lies S.W. by S., and N.E. by N., about 4 miles. When I touched here, in 1821, our chronometers made the longitude (from Rio Janeiro) a few miles more to the Westward, or in $12^{\circ} 5'$ W. The variation in 1825 was $10^{\circ} 59'$ W.

Were Tristan d’Acunha better known it might be of great service to ships bound to India, and particularly to New South Wales, as water is very easily obtained, and also live stock and vegetables of every description. With the wind from West, round by South to N.N.E., in moderate weather, ships can always lie within two miles of the watering-place. The only winds that render it inaccessible are those from North to W.N.W., and these are generally of short continuance; so that, rather than put into the Cape, or Rio, it would save time and expense to get refreshment at this place. On making the island, if the wind was from the northward, I would haul off to windward of Inaccessible Island, and lie there until the wind backed to W.S.W., which at the longest duration will not be more than two or three days. This I did in 1825, when we took on board 20 tons of water, two bullocks, twelve sheep, six pigs, several dozen fowls, and thirty hundred-weight of potatoes and vegetables, which served all hands as long as they would keep good. Had the people on shore a hose, the water might always be filled without taking the casks out of the boat, or even bringing her into the surf.”

EXTRACT OF A LETTER, SIGNED ALBERT, DATED LIVERPOOL, NOV. 18TH, 1833.—“Mr. Glass (generally styled Governor) has cut a trench from the run of water that forms the “Cascade,” from which a hose is attached, and fills the water in the cove. However, if there be any swell running, the best way is to *raft* it, as there is no inconvenience arising from the seaweed, beyond an oar fouling occasionally. Observe, also, that the current generally sets to the E.N.E. The ship ought to keep the cascade to the eastward of south, to enable the boat to fetch the cove with the raft, (supposing the wind westwardly;) and when the boat is returning, and has got a sufficient offing, to run down inside of her, and receive the raft with the head off shore. The people on the island will cheerfully render all the assistance in their power.

The market prices in March last, which were furnished me by Mr. Glass, at the same time assuring me that a plentiful supply might be had, were as follows:—A milch cow and calf, £8; sucking pigs, 2s. 6d.; potatoes, 8s. per cwt.; grown pigs, 10s. and 12s.; beef, 3d. per lb.; sheep, 15s. to 20s; fowls, 18s. per dozen; geese, 5s. each.” (*Nautical Magazine*, for 1834, page 45.)

23. LENNON’S, OR HIBERNIA REEF, was seen by Captain Lennon, of the *Hibernia*, in April, 1817, on his passage to India. When clear of the Island of ‘Trista d’Acunha, he steered E. by S., with a fair wind, until half-past 11 a.m., of the 12th (April), then in latitude $37^{\circ} 31'$ S. longitude $4^{\circ} 42'$ W., ship going at the rate of 7 knots an hour, perceived a sunken rock close on the port bow; bore up immediately, and with great difficulty escaped running on it. The part or end that at one time was close along-

side he could very distinctly perceive. The rock was about 9 feet under water, and at the distance of about one hundred yards, where he supposed the rock was nearer the surface, there appeared fields of weed growing from the rock. On taking a good look out all round, two other rocks were seen.

24. ROBSON'S REEF.—*Extract from the Log of the Barque Ann, from Liverpool, towards the Isle of France, 1829, Captain W. W. Robson.* "Monday, 12th October. Made Trista d' Acunha, the longitude by chronometer exactly agreeing with Captain Heywood's. Sunday, the 18th, at 9h. 30m. a.m., saw on the lee bow what was at first supposed to be whales, but, when a short distance from them, discovered them plainly to be rocks, the highest part about 8 feet above water; luffed, and cleared them by about 50 yards. The sea broke heavy on them, and there was tangle 8 or 9 feet long growing on the rocks. They are about 50 or 60 yards long, something of a horse-shoe shape, with the opening to the S.E."

In allusion to the above-mentioned reef, CAPTAIN JAMES LIDDELL, of the ship Wellington, in a letter addressed to the *Editor of the Nautical Magazine*, dated December 2nd, 1835, says:—"I take this opportunity of alluding to a notice contained in your December number, 1833, respecting a 'crescent rock,' seen by Captain Robson, in the barque Ann, on the 18th October, 1829, in latitude $37^{\circ} 35'$ S., $7^{\circ} 30'$ E. longitude. I confess I was exceedingly surprised when this account first met my eye, as, on reference to my journals, I found I had twice passed nearly over the very spot in the day-time. But, sir, when it is considered that this 'crescent rock' is situated not only in the direct route of all the outward-bound vessels to the eastward, but also in the very cruising parallel of the American whalers, whose number yearly frequenting that part of the ocean exceeds 300, may we not be permitted to suspect, with that able and indefatigable hydrographer Horsburgh, 'that dead whales, shoals of devil-fish, and other huge marine monsters,' are still sometimes mistaken for banks and rocks. Three years ago, within a short distance of the reported site of this 'crescent rock,' we saw at one time around us *six* American whalers."

25. TELEMAQUE ROCK.—This danger seems to have been first observed by Captain Geraud, of the French brigantine *Telemaque*, who states, that not only was green moss and grass seen upon the rock, but in some places the bare rock appeared perfectly distinct and plain on both sides of the vessel. Subsequent navigators seem to agree as to the existence of this danger, though it has been much doubted by others; at all events, it is generally agreed, that the correctness of the position assigned is very questionable.

26. ARIEL ROCKS.—*Extract from the log-book of the schooner Ariel, of Whitehaven, Thomas Dixon, master, on her passage from Liverpool to Valparaiso. December 22nd, 1827:—*"At 11h. 45m. a.m., moderate breezes from the N.E., steering S.S.W. by compass, saw something of a reddish appearance, a little above water, at about a quarter of a mile distant. Hauled in for it, sounded, and obtained bottom at 47 fathoms, fine grey sand. The object seen was about 6 feet above water, and 20 or 30 feet in circumference, but more extensive underneath. When close-to, we saw another head, at about 2 or 3 cables' length to the N.E. of the first, also of a reddish appearance. The sea was breaking over them with a noise; there was some seaweed, and a number of sea-birds about them. These dangerous rocks lie in the general track of vessels round Cape Horn, to the west coast of South America. The latitude was obtained by a good meridian altitude of the sun, and the longitude by good lunar observations taken that day, and by chronometric observations."—*Nautical Magazine*, for 1832, page 115.

These rocks were sought for by Capt. King, but unsuccessfully. He says in vol. 1., p. 460, of the *Narrative of the Voyages of the Adventure and Beagle*:—

“On June 21st, 1830, we sailed with a fresh breeze from the S.W. ; and at 9 a.m. on the 25th, when about one mile southward of the alleged position of the Ariel Rocks, and near the nominal longitude, I hauled to the wind, and ran some distance on their parallel, looking out for broken water. There was a very regular and heavy swell, as much as would be raised by a gale of wind, but caused, apparently, by a current ; and, while waiting for the meridian altitude, before bearing up, having ran twenty miles on the same parallel, a heavy swell rose on the quarter, which struck our weather-quarter boat. For a moment I thought we had indeed found the rocks ; and the huge black back of a dead whale, which just then showed itself very near the vessel, much increased the sensation. I imagined that we were in a meeting of tides and currents, where old trees, dead whales, &c., are often found, and having frequently caused reports of rocks ; for the water was not more shallow then we had found it during the day, the soundings having varied from 40 to 50 fathoms ; so having obtained the meridional altitude we bore up, and steered our course again.

In vol. 2, p. 119, of the same work, Capt. Fitzroy says, “In the first volume some notice was taken of the supposed Ariel Rocks, and I will avail myself of this opportunity to say that at various times the Beagle passed over and near their asserted position ; and that she likewise searched for the reported Aigle shoal or rock, without ever finding the slightest indication of either.”

GOUGH'S ISLAND.—This island is about 15 or 16 miles in circumference, being elevated about 4,380 feet above the level of the sea, and has some small bushy trees on it. The cliffs rise almost perpendicularly from the sea, and several beautiful falls of water issue from the chasms between them. Near the N.E. point is a rock resembling a church, with a high spire on its western end, to the southward of which, on the east side of the island, a rocky islet lies near the shore. Within this islet the landing is safe and easy, being protected by the N.E. point from the swell and northerly winds.

28. ISLE GRANDE.—*Extract of a letter from CAPTAIN A. HAIG, of the Sir John Rae Reed, in latitude 19° S., longitude 31° W.*—“On the 5th instant,* we discovered an island in latitude 46° 40' S. and longitude 48° 35' W. It was first seen about 4 p.m., bearing N.W., about 4 leagues distant. I hauled up a couple of points, to get a better view of it, but night coming on, and a hard gale blowing, I regret to say, I was prevented from surveying it so accurately as I could have wished. At first we thought it an ice island, but, on a nearer view, all hands were convinced of its being a rocky islet, elevated about one thousand feet above the level of the sea. A detached black rock was seen to the eastward of it. The nearest land to this that I have heard of is Isle Grande, differing very much both in latitude and longitude. There is still a possibility of our having been deceived by an ice island ; but the numerous birds we were surrounded by, during the forenoon, argues strongly in favour of land, more especially as shags and divers were seen—a species of bird that is only met with where the land is near. The position of Isle Grande is said to be very doubtful.”—*Times Newspaper*.

REMARKS BY THE EDITOR OF THE NAUTICAL MAGAZINE FOR 1835, PAGE 1.—“That the island named Isle Grande, by La Roche, in 1675, has ever since that time remained absolutely unknown, throws some degree of interest

on the foregoing report of Captain Haig. As there are also several reasons for supposing it was an island, and no iceberg, that was seen by this gentleman, the present seems to be a favourable opportunity for considering the subject of La Roche's long-questioned discovery.

On the first glance over the materials we have collected, belonging to the subject, the most striking feature that presents itself is the vast extent of surface over which birds, pieces of wood, branches of trees, sea-weed, feathers, spawn, and an unusually quantity of whales, have been seen by various navigators; and it is equally worthy of observation, that this extent of the ocean, which amounts to about 700 miles, is greatest in one direction, namely about N.E. and S.W., that of the prevailing wind and current.

Isle Grande is laid down in the following meridians on the charts, in the parallel of 45° , namely, $35^{\circ} 30'$, $38^{\circ} 30'$ and $46^{\circ} 30'$ W.; the last according to Dalrymple, who appears to have had some strong reason for differing so much as 10 degrees from the first, which was the longitude assigning to it by Captain Cook. From conclusions so widely apart as these we may safely infer, that the data on which they rest must be of a slender kind.

Considering the materials before us in the order of their date, the first we come to is the account of a search for it by the unfortunate La Perouse. This celebrated navigator reached the parallel of $44^{\circ} 38'$ S., in 34° W., on the 7th of September, 1785; between which time and the 27th December following, he beat to windward, between the latitudes of 44° and 45° , till he reached the longitude of 49° W. Perouse seems to have gladly given up his search, (although disappointed,) and, while he states his conviction that the island does not exist in the part he had traversed over, he considers that the search for it should not be abandoned. He says, 'We passed sea-weed, and were for many days surrounded by birds.' But although Perouse did not find Isle Grande, he did much to forward its discovery, by proving that it does not exist in the latitude so perseveringly assigned to it by those who have considered the question of its position; and it is rather surprising that it should still have remained on the charts in the parallel of 45° .

Colnett, in March, 1793, passed the eastern limits of the supposed position of Isle Grande, and in latitude $40^{\circ} 12'$ S., longitude $34^{\circ} 8'$ W., he found the sea covered with feathers, birch twigs, drift-wood, and sea-weed. Passing to the southward the same day, many birds and whales were seen: indeed so many of the latter, that one was pursued by his boats, and he remarks, that 'the number of whales in sight presented a fair opportunity of making a profitable voyage in the article of black oil; but my predominant object,' he adds, 'was to fulfil the particular services recommended to me by the Lords of the Admiralty.' The number of birds seen by him must have been very great when he says, 'Had they all been on the wing together, and above us, instead of rising in alternate flocks, and skimming after the whales, the atmosphere must have been altogether darkened by them.' Colnett had imbibed the opinion of Cook, and expected to have seen the island in the position assigned to it by the 'father of circumnavigators,' and with this motive he stood to the southward, with the wind fresh from W.N.W. In his way he met with many birds, and much sea-weed, till reaching the parallel of 45° , when the whole gradually disappeared; and Colnett continued his voyage to the Pacific, in the hopes of being more successful on his return. This, however, was not the case, and he had no opportunity of doing more towards the discovery of its position. Colnett sounded occasionally, without success, with 200 fathoms of line.

Vancouver also appears to have inclined to the opinion of Cook, in the position of Isle Grande, and broadly states, that 'if such land has any existence, it will be found not very far remote from the situation assigned to it by Captain Cook; a fact,' he says, 'I was very desirous of establishing.' Vancouver was unsuccessful; but although he did not establish it in Cook's position, he ascertained that it was not in that assigned to it by Dalrymple.

But more light seems to have been thrown on the supposed position of this island by modern navigators; and among them, Captain Andrew Livingstone has certainly done more towards its re-discovery than any other. Indeed, the solicitude with which this gentleman has gone into the question, and the anxiety he has evinced for the safety of navigators, by his endeavours to remove the veil of obscurity by which it has been so long concealed, are highly creditable to him. In the month of June, 1824, Captain Livingstone, on his way into the Pacific, entered the questionable limits of the neighbourhood of Isle Grande, and, aware of the importance of his remarks, noted them down carefully. In the latitude 43° S., and longitude $45^{\circ} 30'$ W., he observed an immense number of birds, which, as he continued to the S.W., do not appear to have followed him. But, on the 7th of the same month, we find him, at noon, passing within about 20 miles of the position of the island reported by Captain Haig, without making any such discovery.

On his return from the Pacific, in September, 1825, we find rock-weed noted by Captain Livingstone, a short distance to the southward of the same position in which he saw it on his way out; and on the 10th of that month, in about $45^{\circ} 40'$ S., and $42^{\circ} 30'$ W., the remarkable circumstance is mentioned by him of a lark flying on board his ship. Captain Livingstone for some time preserved his refugee, with a romantic kind of superstition, as a sure pledge that so frail and delicate a little thing must have come from land, at no great distance from him.

Not only has Captain Livingstone supplied us with his own observations, but he has collected much information from other navigators, on the important subject before us. We learn from him, that brushwood was seen by the brig Inca, in the latitude of $43^{\circ} 30'$ S., and longitude 43° W., and that in latitude $44^{\circ} 45'$ S., and longitude $43^{\circ} 30'$ W., land is said to have been seen by the Salacia. The brushwood seen by Mr Lincoln, in the Inca, appeared to have been some days in the water, and might have drifted from the S.W., the direction in the position of which Haig's Island was seen. The position of the brig Salacia from the Pacific was calculated by Captain Livingstone, and is in a S.S.W. direction from the position of the Inca, and between it and that of Haig's Island; and we should also have observed, that on the same day on which Captain Livingstone caught the lark, other land-birds were seen, besides much rock-weed and tangle, all of which gradually disappeared as he proceeded to the northward.

With the foregoing data, we have to consider the position of the island reported by Captain Haig. That an island does exist somewhere about these parts, there would seem to be good reason for supposing, or from whence can come all these indications* of land that have been so frequently seen? And, allowing that an island does exist there, unknown, and concealed from the destroyer—man, it may easily be supposed to afford ample and secure retreat for the numerous birds that have been seen thereabouts. But the probable position of it is the important point; and this involves all that we have had before us.

* The Falkland Islands are not wooded, to allow of the supposition that the branches can be seen from them.

We had got thus far in our investigation of the position of this island, when we found in the British Museum the work to which Dalrymple refers, as his authority for the actual existence of it. The title of it runs thus:— ‘*Descripcion Geographica, y Derrotero de la Region Austral Magallanica, Que le dirige, &c. Año de 1690. Comprestó por el Capitan Don Francisco, Seixo y Lovera, &c.*’

Having laid the foregoing before our readers, we are at a loss to imagine upon what pretensions the island could have been laid down in the chart, more particularly, when it is known that icebergs are so prevalent, at certain seasons of the year, in that part of the ocean. The only thing certain is the derivation of the name, *Isle Grande*, signifying a very large island; all the rest is mere conjecture.†

Captain Haig’s letter was dated in March, (1834,) and the circumstance of icebergs being met with by H.M.S. *Pylades*, under the command of Captain Blanckley, on the 6th of March, in latitude 37° S. and longitude $47^{\circ} 30'$ W., corroborates our opinion, that this was nothing more than one of them. It was reported, we believe, that there were more icebergs than usual in the South Atlantic at that time, and that they extended further north than where they are commonly found.”

29. BOUVET’S, OR CIRCUMCISION ISLAND—This island was first discovered by Monsieur Bouvet, and has subsequently been seen by the *Swan* and *Otter*, two English vessels, at different periods. The *Swan*, in 1808, discovered high land, and used every effort for 4 or 5 days to get close to it, without being able to get nearer than 3 miles, on account of a mass of solid ice surrounding it, and the land itself was covered with snow. Their situation was rendered very perilous at times, being beset with loose masses and islands of ice, in dark blowing weather, which forced them to depart from this inhospitable place on the 11th of October. It appeared about 5 miles in extent, east and west. The west end, which is very high land, is named Dalrymple’s Head, or, as Monsieur Bouvet named it, Cape Circumcision. Although the *Swan* was prevented by the ice from approaching close to it in October, this might probably be effected in January or February.

This island was visited in December, 1832, by Captain Morrell, who observes that it lies nearly true East from South Georgia, being in latitude $54^{\circ} 15'$ S., and longitude $6^{\circ} 11'$ E., about 400 [430] leagues S.S.W. (true) from the Cape of Good Hope. We continued our course, with variable winds and occasional heavy weather, attended with much snow and hail, until Friday, December 6, when we saw the island for which we were bound, bearing E.S.E., distant one league. This was at 2 p.m., and at 3 the next morning I sent the second mate with a well-manned boat to search for seal, on the shores of the island. At 7 a.m. the boat returned with eighty-four seals of a superior quality; and the officer reported that the seal were perfectly tame, so much so, that they would come up and play among the men who were skinning their companions. On the western shore of the island was fine anchorage inside of an immense number of ice islands, lying from one to three miles off-shore; all of them a-ground in from 10 to 100 fathoms of water. Some of these islands were a mile in circumference, and lay so close to each other that it was with difficulty that the vessel was gotten between them to the anchorage: but here, on the N.W. side of the island, in 17 fathoms of water, she anchored, about half a mile from shore, entirely sheltered by the ice islands on one side, and Bouvet’s Island on the other, from every

† The Spanish description, with its translation, will be found in the *Nautical Magazine* for 1835, page 4.

point of the compass. On the morning of the 8th, at 3 a.m., they were again sent to examine the island, and discover new rookeries; but after sailing completely round, not another spot could be found on which a seal could land, the shores being either perpendicular, or covered by projecting cliffs.

30. L' AIGLE SHOAL is said to have been seen on the 1st of October, 1817, by Mr R. Poole, of the ship L' Aigle, by whom it is placed in lat. $51^{\circ} 51'$ and $64^{\circ} 30'$. It was described as extending North and South 200 or 300 yards. The ship was then steering S.E., and about three-quarters of a mile from it, off and on, steering South, about a mile and a half, had soundings in 87 fathoms.

The existence of this shoal is considered very doubtful. It has been unsuccessfully sought for by Captains Jaffray, Weddell, and Lincoln; the former searched for it five times, twice in the year 1819, once in 1820, again on the 13th June, 1821, and the last time in March, 1824; he then resolved, however often he might pass, never to look for it again. Captain Jaffray says "that between the Falkland Islands and the mainland, as well as in many parts of the Chinese Sea, he has seen *tide-rips* or *races* appear like very high breakers, and perhaps no soundings at the place. The imaginary shoal of L' Aigle seems therefore to have been a rip of this description only. Captain James Weddell, in H.M.S. Tartar, on the 2nd of January, 1823, was in latitude $51^{\circ} 55'$ S., and longitude $65^{\circ} 7' 15''$ W., and hauled up in order to obtain a sight of the shoal; but, with a run of 14 miles, and a view of 10 from the mast-head, nothing of it was seen. Lastly, Captain Lincoln, of the brig Inca, cruised in search of it, so that if it had existed it could scarcely have been missed.

31. AURORA ISLES, supposed to have been first seen in 1762, by the ship Aurora, after which they were named, and again in 1790, by the ship Princessa. The corvette Atrevida, in 1794, went purposely to ascertain their positions, and they were then described as three, very nearly in the same meridian; the central one rather low, and the other two so high as to be seen 9 leagues off. *Positions*—northern isle, latitude $52^{\circ} 37' 24''$ S., longitude $47^{\circ} 43' 30''$ W.; middle isle, latitude $53^{\circ} 2' 40''$ S., longitude $47^{\circ} 55' 30''$ W.; southern isle, latitude $53^{\circ} 15' 22''$ S., longitude $47^{\circ} 57' 30''$ W. From the credibility of the documents Captain Weddell was induced, in 1820, to make a strict search for the islands, the particulars of which he has given at large. He traversed in every direction, but nothing like land, even in fine clear weather, was to be seen; at last he says, 'the only chance now left us for finding these Auroras, I conceived, was by making various courses between the latitudes of $53^{\circ} 15'$ S., and $52^{\circ} 37'$ S.; and this we did, till we reached the longitude (by chronometer) of $46^{\circ} 29'$ W. Having all this time seen nothing resembling land, excepting fog-banks, which had often given us severe disappointment, we returned westward, and on the 5th of February, at noon, our latitude was $52^{\circ} 44'$ S., and longitude $48^{\circ} 33'$ W. We had thus again passed over the site of these islands to no purpose. On the 6th, our latitude, by observation, was $53^{\circ} 24'$ S., and longitude, by chronometers, $49^{\circ} 49'$ W. We continued to stand to the westward, under easy sail, with the wind northerly; and on the 7th, our latitude, by observation, was $53^{\circ} 33'$ S., and longitude $51^{\circ} 5'$ W. Having thus diligently searched through the supposed situation of the Auroras, I concluded that the discoverers must have been misled by appearances; I therefore, considered any further cruise to be an improvident waste of time, and, to the gratification of my officers and crew, directed our course to the Falkland Islands.

The islands have since been sought for by Captain Morrell, Captain Bis-

coe, Captain Johnson, of New York, and others, but with no better success ; and of their *non-existence* there seems no longer to be any doubt.

32. THE SHAG ROCKS are said to be in latitude $53^{\circ} 48'$, and longitude $43^{\circ} 25'$, and have been represented to be even with the water, but Captain Weddell says, "this I believe not to be the case, as I have been credibly informed that they appear in three pinnacles, or in the shape of sugar-loaves, 60 or 70 feet high, with a reef running around them. These reefs, I presume, have given rise to the supposed existence of the Aurora Islands."

33. KAINS' ISLET is said to have been passed in November, 1828, by the Kains transport, Lieutenant T Burdwood, agent, in her passage from Rio Janeiro to Valparaiso, who places it in $54^{\circ} 9'$ S., and long, $59^{\circ} 36'$ W. The *existence* of such a rock had been reported by the Spaniards in 1813, but was considered as doubtful. Should this islet *exist*, it must lie about 110 miles South from the Falkland Islands,—a tract of sea frequently traversed by Captain Weddell and others.

34. POTTINGER'S BANK was passed over on the 5th of January, 1822, by Captain Pottinger, of the brig Tartar, of London, on his passage from South Georgia to South Shetland, in latitude $54^{\circ} 36'$ S. longitude $57^{\circ} 49'$ W., soundings, 65 fathoms, coral rocks, with sea-eggs and shells. He supposed that he had passed over a considerable and much shoaler part of it before day-light, judging by the agitated state of the sea.

35. ISLANDS OF ALEXANDER AND PETER, the first in $68^{\circ} 57'$ and 73° W., the other in 68° S. and 91° W., were discovered by the Russian Captain, Bellinghausen, in 1821. Two frigates under this commander, it appears, were employed on a voyage of exploration, and penetrated to the 69° of South latitude, but were unable to proceed further. The particulars of this voyage have not been made known.

ICEBERGS.—Captain Horsburgh observes, that icebergs off the bank of Cape Agulhas probably have been the cause of the loss of some missing ships ; for Captain Milchior, of the French ship *Harmonie*, has given an extract from his journal of the 7th April, 1828, stating, that in latitude $31^{\circ} 50'$ S., longitude $15^{\circ} 45'$ E. from Paris, he fell in with several clusters of icebergs, some of which appeared to be more than two cables' length from the nearest large pieces of ice, upon which the sea broke violently. If this statement be correct, it is very remarkable that icebergs should have been found in the situation here given ; for, hitherto, none appear to have been seen to the northward of latitude 44° or 45° S., in the Southern Ocean, near the longitude of the Cape Bank ; and that these icebergs should have been seen early in April, or in the autumn of the southern hemisphere, when the sea ought to be clearer of ice for a greater distance to the southward than at any other season, renders this statement of Captain Milchior's still more surprising.

THE FALKLAND ISLANDS.

THE FALKLAND ISLANDS, (by the Spaniards named the MALVINAS) form a group or cluster of nearly ninety islands, extending north and south from latitude $50^{\circ} 58'$ to $52^{\circ} 46'$ S., and east and west from longitude $57^{\circ} 32'$ to $61^{\circ} 29'$ W. They were first seen in 1592, by Captain Davis, who sailed under the command of Sir Thomas Cavendish, and two years afterwards by Sir Richard Hawkins. They were afterwards successively seen by other navigators, such as Dampier, Cowley, Strong, &c. Strong, in 1690, sailed

through and anchored in the channel, which he named Falkland Sound, the name of Falkland being subsequently applied to the islands. There is no appearance whatever of these islands having ever been inhabited previous to their discovery by Europeans; and the navigators who first landed on their shores found the animals so totally unacquainted with man, that the birds suffered themselves to be taken by the hand, and even settled upon the heads of the people.

The first attempt at settling in these islands was made by the French, after losing Canada, in 1763, who selected them as a place of shelter and refreshment for vessels bound to the South Seas. For this purpose they established a little colony on the eastern island, at Berkeley Sound, which they denominated the Bay of Acheron. Two years afterward, the British took possession of these islands, and settled a colony in Port Egmont. But neither attempts succeeded. The French ceded their settlement to the Spaniards in 1767; and the English abandoned theirs, as useless, in 1774. The Spaniards seem to have made no use of them, other than as a place for the transportation of convicts. In the month of November, 1820, Commodore Jewitt, then commanding the *Heroine* frigate, took formal possession of the islands, in the name and by the authority of the United Provinces of South America, or government of La Plata, otherwise Buenos-Ayres.

After these islands had been abandoned by the Spaniards, they remained unoccupied until the year 1825, when Don Louis Vernet, a German by birth, resident in America from his youth upward, was induced to visit and inspect them, with a view of settling there. Having matured his plans, he returned, and made application to the government of La Plata, upon whom he had certain claims, for a grant of them to him. He partially succeeded, and this government made over to him the eastern island as his property for ever, with entire and sole right to all its soil, cattle, horses, hogs, fisheries, &c., and he consequently formed a settlement upon it. Subsequently, however, the settlement was abandoned by its proprietor, who, however, left a remnant of the population, under the superintendence of Mr Matthew Brisbane.* In December, 1832, the sovereignty of the islands was disputed by the government of Fredonia, as to the right of La Plata; and while the dispute was contested, the islands, under an order of our government, were taken possession of by Commodore Onslow, of H.M.S. *Clio*, who left a small party at Port Louis, under a Mr William Dickson, for the protection of the British flag; but, unfortunately, without adequate protection for them and the people left by Mr. Vernet. And it appeared, by a dispatch, dated November, 1833, that eight gauchos† and Indians, of bad character, on the 26th of August, in that year, had attacked and murdered Mr. Brisbane, Mr. Dickson, and three other principal persons; after which they pillaged the houses, plundered the place of whatever it contained, and drove off all the cattle and horses up the country, laden with their booty. Thirteen unarmed men, three women, and two children remained in the town two days with the murderers,‡ and then escaped to the islands in the bay, where, until relieved, they lived upon eggs only. On the return of a party which had left the settlement, for the purpose of sealing, it was found, on examination, that all the trunks and boxes

* This gentleman was the friend and companion of the respected Captain Weddell, in his enterprising voyage of 1822, 3, and 4. He then commanded the cutter *Beaufoy*.

† The country peasants of South America, celebrated for their horsemanship, and the use of the *bolos* and the *lasso*, with which they catch wild horses and other cattle.

‡ They were ultimately taken, and sent for trial to Buenos-Ayres. •

had been broken up, and every article in the houses ransacked and cut to pieces. The bodies of Mr. Brisbane and others were found, and the English jack was again hoisted.

At the beginning of the year 1834, Lieutenant H. Smith, R.N., was appointed governor of these islands, accompanied by a small party, as the nucleus of a future colony. The old settlement, at the head of Berkeley Sound, was fixed upon as the head quarters. It was estimated, this time, that 7,000 head of fine wild cattle, and 500 wild horses, were roaming over a large expanse of most excellent pasturage. "In one point of view, these islands present to the English a most important feature. It has hitherto been the custom, for almost all vessels returning home from the colonies of New South Wales and Van Diemen's Land, to put into Brazil for refreshments. This takes them out of their direct track, causes great loss of time, and is done only by incurring such expenses as very materially lessen the value to the owners of the ships' cargoes. But the eastern island lies in the direct track of every ship, after she has doubled Cape Horn. It possesses a beautiful harbour, of easy access, where can be obtained excellent water, fine beef, good vegetables, and in case of the illness of seamen, plenty of the finest antiscorbutic grasses." The two main islands are now denominated the EAST AND WEST FALKLAND. The western island is the *Grand Maluina* of the Spaniards, and the eastern the *Soledad* of the French. FALKLAND SOUND, which separates these islands, is from 7 to 12 miles broad, and it contains many islets; but, by attention to the chart, it may be navigated with safety. Its harbours are safe and commodious.

EAST FALKLAND ISLAND.—To M. Louis Vernet, whose name has been already noticed, the public are indebted for the following description, which was communicated to the Royal Geographical Society, by Sir Woodbine Parish, Esq., 14th January, 1833. East Falkland Island is favourably situated, both for colonization, and for the refreshment of vessels bound round Cape Horn. Its proximity to the Cape, and its excellent harbours, most of which are of easy access, with good holding-ground, and sufficient depth of water for even first-rate men-of-war, would alone make it a valuable possession; whilst the facilities it affords for exercising ships' companies ashore, without the risk of losing them, together with the abundance of wild cattle and antiscorbutic herbs found there, point it out as a most desirable resort for ships which have been long at sea, and whose crews are threatened with scurvy.

The climate on the island is, on the whole, temperate. The temperature never falls below 26° Fahrenheit in the coldest winter, nor rises above 75° in the hottest summer; its general range is from 30° to 50° in winter, 50° to 75° in summer. The weather is rather unsettled, particularly in winter; but the showers, whether of rain, snow, or hail, are generally of short duration, and their effects are never long visible on the surface of the ground. Thus, floods are unknown; snow disappears in a few hours, unless on the tops of the mountains, and ice is seldom found above an inch thick. Thunder and lightning are of rare occurrence; fogs are frequent, especially in autumn and spring, but they usually dissipate towards noon. The winter is rather longer than the summer, but the difference is not above a month, and the long warm days of summer, with occasional showers, produce a rapid vegetation in that season.

The wind blows commonly from the N.W. in summer, S.W. in winter, and seldom long from the eastward in either season. The finest weather in winter is when the wind draws from the W. or N.W., and, in summer, when it stands at N.W. or N.E. A north wind almost always brings rain, especially

in summer; and E. and S.E. winds are constantly accompanied by thick and wet weather. Snow squalls generally come from the S.S.E.; South, or S.S.W. storms are most frequent at the changes of the seasons, and blow commonly from S.S.W. to W.S.W., but they seldom last above 24 hours.

The soil of East Falkland Island has been found well adapted to cultivation, consisting generally of from six to eight inches of black vegetable mould, below which is either gravel or clay. Wheat and flax were both raised, of quality equal, if not superior, to the seed sown, which was procured from Buenos Ayres; and potatoes, cabbage, turnips, and other kinds of vegetables, produced largely, and of excellent quality. Fruit trees were not tried, the plants sent from Buenos Ayres having perished before they arrived.

The soil also produces different kinds of vegetables wild, as celery, cresses, &c., and many other esculent plants, the proper names of which were not known to the settlers, but their palatable taste, and valuable antiscorbutic properties, were abundantly ascertained by them. Among others is one which they call the tea-plant, growing close to the ground, and producing a berry the size of a large pea, white, with a tinge of rose colour, and of exquisite flavour. A decoction of its leaves is a good substitute for tea, whence its name. It is very abundant.

No trees grow on the island, but wood for building was obtained, tolerably easily, from the adjoining Straits of Magalhaen. For fuel, besides peat and turf, which are abundant in many places, and may be procured dry out of the penguins' holes, three kinds of bushes are found, called fachinal, inatajo, and gruillera. The first of these grows straight, from two to five feet high, and the stem, in proportion to the height, is from half an inch to one inch and a half in diameter: small woods of this are found in all the valleys, and form good cover; it bears no fruit. The second is more abundant in the southern than in the northern part of the island; its trunk is nearly the thickness of a man's arm, very crooked, never higher than three feet, and bears no fruit. The gruillera is the smallest of the three, growing close to the ground, and abundant all over the island; being easily ignited, it was chiefly used as fuel, when the people were away from the settlement, and to light the peat-fires in the houses. It bears a small dark red berry, of the size of a large pea, of an insipid taste.

The country, in the northern part of the island, is rather mountainous. The highest part was called San Simon, at no great distance from the bottom of Berkley Sound. The tops of the mountains are thickly strewn with large boulders, or detached stones, of which quantities have fallen, in some places, in lines along their sides, looking like rivers of stones; these are alternated with extensive tracts of marshy ground, descending from the very tops of the mountains, where many large fresh-water ponds are found, from one to two feet deep. The best ground is at the foot of the mountains, and of this there is abundance fit for cultivation, in plains, stretching from 5 to 15 miles along the margin of the sea. In the southern peninsula there is hardly a rising ground that can be called a hill. Excellent fresh water is found everywhere, and may be procured either by digging, or from the rivulets, which flow from the interior towards the sea, through valleys covered with a rich vegetation.

Herds of wild horned cattle exist on the island, sufficient to maintain a great many settlers, and wild hogs are abundant in the northern peninsula: wild horses are also found there, of small size, but very hardy, which, when broken in, as some were without difficulty, were found of great service to the settlement. Rabbits are in great numbers, of a large size, and fine fur.



BERKELEY SOUND.

Surveyed by the Captain, H. H. P. Pugh

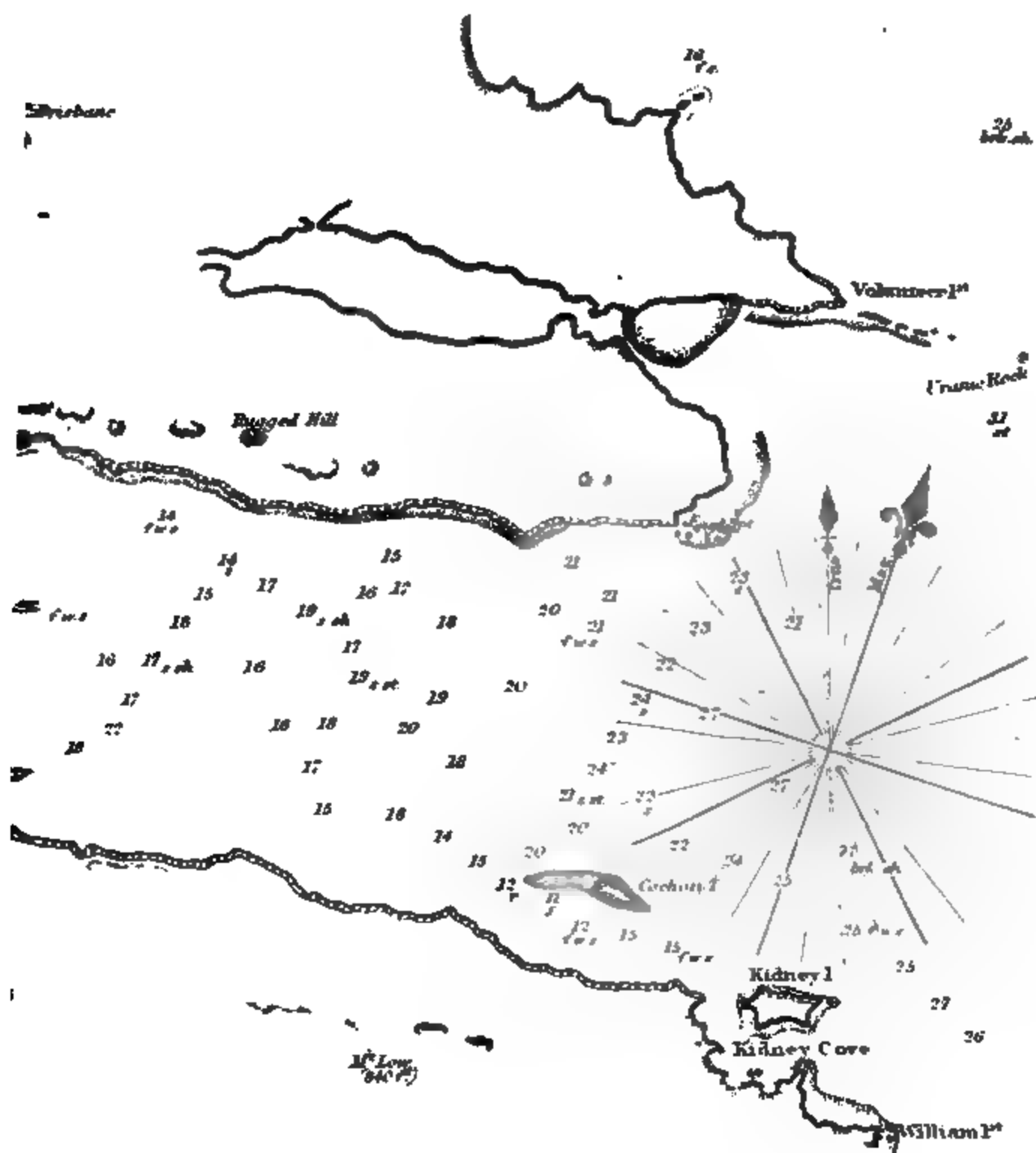
High Water F & C V hours

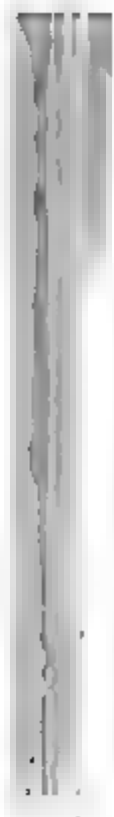
Rise 7.6'

Scale of Nautic Miles



The dotted Shoals are muds, help which vessels should avoid





31

32

Foxes, too, are found, but differing considerably from those of Europe, having a thick head and coarse fur; they live chiefly on geese and other fowls, which they catch at night when asleep.

Game is extremely common, especially wild geese and ducks; of the former two kinds were distinguished, the lowland or kelp geese, and the upland geese; the latter were much superior in flavour, the former being of a fishy taste, living chiefly on muscles, shrimps, and kelp. Both were very tame, and the upland geese were easily domesticated. They are finest eating in autumn, being the fattest, in consequence of the abundance at that season of tea-berries, of which they are very fond; the rest of the year they live on the short grass. They have a white neck and breast, with the rest of the body speckled of a fine brown marbled colour. The lowland gander is quite white, and the goose dark, with a speckled breast.

Of ducks there are several kinds. The loggerheaded are the largest, and almost of the size of the geese; their flesh is tough and fishy; they cannot fly, and when cut off from the water are easily caught. The next size is also of inferior quality, tough and fishy; but the smaller kinds, which are not larger than young pigeons, are deliciously good, and are found in large flocks along the rivulets and fresh-water ponds. Snipes are found so tame, that they were often killed by throwing ramrods at them. In addition to these, a great variety of sea-birds frequent the shores, of which the most valuable to sailors and settlers, from the quantity of eggs they deposit, are the gulls and penguins. These birds have their fixed rookeries, to which they resort, in numerous flocks, every spring; the gulls generally in green places near the shore, or on the small islands in the bays; the penguins chiefly along the steep rocky shores of the sea. The eggs of both are eatable, even with relish, after long confinement on board ship,—the penguin's being, however, the best, and less strong than that of the gull. So numerous are these eggs, that on one occasion eight men gathered 60,000 in four or five days, and could easily have doubled that number, had they stopped a few days longer. Both gulls and penguins will lay six or eight each, if removed; otherwise, they only lay two, and hatch them. The gulls come first to their hatching-places, and the penguins a little later.

Fish abounds in all the bays and inlets, especially in spring, when they come to spawn at the mouths of the fresh-water rivulets. They generally enter and retire twice every day, at half-flood and half-ebb, and are in such numbers, that ten or twelve men could always catch and salt about sixty tons in less than a month. They were usually caught by a sweeping-net, but they also took the hook, being of a kind between the mullet and salmon. Their flavour was excellent, and when salted, they were considered superior to the cod;—many ship-loads might be procured annually.

Of shell-fish there are only muscles, and clams; they are very abundant, and easily gathered on the beach at low water.

Seals are found on the island, or rather on the rocks close to it; and hair-seals (lions and elephants) abound along its shores. Many black whales have been also caught in its neighbourhood, in consequence of which, the island has of late years been much resorted to by fishing-vessels—English, American, and French; of these 89 touched at it between 1826 and 1831."

BERKELEY SOUND.—Vessels approaching Berkeley Sound, from the northward, should endeavour to make the land 10 or 15 miles west of the port, the prevailing winds being westerly; and when approaching from the southward, should, in like manner, make allowance for the currents, which frequently run very strong to the northward. When entering the Sound, a

sufficient berth must be given to the ledge of rocks, named the Volunteer Rocks, which run out from the north point about $1\frac{1}{2}$ mile; outside of which, in nearly the same line, at a farther distance of about another mile, is a single sunken rock, with only 6 feet on it at low tide. When these rocks are cleared, and the sound is fairly entered, there is no danger, except from a small ledge of rocks off Eagle Point, about 2 cables' length from the shore, with kelp growing all over it, and therefore easily seen. Above this point the sound is quite clear till well up, when a ledge of 5 or 6 black rocks will be seen on the north side, behind which is an excellent harbour, named Johnson's Harbour, with good holding ground in 6 or 7 fathoms, and greater convenience for watering than in any other part of the bay.

If a ship, endeavouring to enter Berkeley Sound, find the wind blowing hard down, which is often the case, and is thus prevented getting to a suitable anchorage in the bay, a good port exists immediately south of the sound, and about $2\frac{1}{2}$ miles from the small islands in its mouth, named Port William, or Harriet's Bay. This is of easy access, and fresh water may be easily obtained in it. In going in, ships should keep on the north shore, about 2 cables' length distant, as the tide runs strong. The flood runs to the southward, and the ebb to the N.E.

To the south of Berkeley Sound, the coast of East Falkland Island should not be approached too near, particularly in thick weather, there being many low and dangerous islands lying off, some of them even out of sight of the land, particularly to the southward.

On Cape Pembroke, the easternmost point of the islands, there is a triangular beacon, painted red and white, which can be seen 5 to 10 miles off. On entering Port William a pilot will come off.

PORT STANLEY, in Port William, possesses peculiar advantages: it is easily entered, is well protected, has a safe anchorage, and is a most desirable harbour of refuge, during the westerly gales, as prevalent in the latitude of Cape Horn. In addition to these advantages, it possesses numerous others: it is situated directly in the course of vessels going to or returning from the Pacific, and is generally sighted by them; it furnishes (which ships after a long voyage so much want) fresh water, fresh beef (cheap and abundant), and vegetables of every description, at very moderate charges.

The advantages of emigrant ships of having an intermediate port in the Atlantic, where they can obtain supplies, on reasonable terms, without incurring the heavy charges of the Brazilian ports, must be very obvious, as much of the space used for stowing provisions and water might be more profitably employed in carrying passengers and cargo.

The harbour is so situated that it is almost impossible to put a vessel in an unsafe position, should the wind prevent you entering the port at night. The dangers in the vicinity are few, near the land, and, with one or two exceptions, are above water, so that it has been said that one may run for it with ordinary prudence, even without a chart, only taking precaution not to approach the coast nearer than $2\frac{1}{2}$ miles in the night-time. In the day-time the kelp will indicate any danger, with the exception of the Volunteer Rock off the north head of Berkeley Sound. These remarks apply to the coast from the Sea Lion Isles to Berkeley Sound.

Stanley Harbour has been described as one of the easiest and safest harbours in the world. There are, properly speaking, two harbours: Port Stanley (the inner) and Port William (the outer.) A vessel calling for supplies has no occasion to enter the inner harbour, the entrance to which is deep but narrow, as you can bring up in from 7 to 9 fathoms, and be land-locked

in the outer. The winds, for three-fourths of the year, prevail out of the harbour, which lies nearly W.S.W. The distance to beat up is not more than 4 miles, with plenty of room.

When running for the harbour, with a commanding breeze anything southward of West, keep to seaward of the Wolf Rock, and pass between the Seal Rocks and Cape Pembroke, and then between the Billy Rock and Seal Rocks, where there is plenty of water and no danger that may not be seen. Having passed the Billy Rock, haul up, and if in doubt, or if the pilot has not come off, anchor abreast of the William Islets; but in day-light there is no danger in standing in to the entrance of Stanley Harbour. The above directions are for westerly winds, which generally prevail; but when the wind is easterly, keep outside of the Seal Rocks. Coming from the northward, with westerly winds, make Cape Carysfort, or with easterly winds, Volunteer Point; when they are passed, steer for Cape Pembroke, on which the beacon will be seen, until Port William opens to starboard, when run in and anchor, or wait for a pilot, according to the above directions. In case of darkness or fog, ships may anchor in the mouth of Berkeley Sound, or stand off and on, as may be expedient, there being no danger that is not buoyed by the kelp. The Wolf Rock bears from Cape Pembroke S. $\frac{1}{4}$ W., distant nearly 3 miles; it is of a triangular shape, each side being about 3 cables' lengths. The Seal Rocks lie about three-quarters of a mile from Cape Pembroke, and are clean on all sides. The tide runs north and south about 3 knots between Cape Pembroke and the Seal Rocks; the flood setting to the northward, and the ebb to the southward.

REMARKS BY MR. EDWARD GULLIVER, R.N.—“BERKELEY SOUND is easily made out by the breadth of the entrance, which is plainly visible some miles at sea. Off Cape St. Vincent are the Volunteer Rocks; and a sunken rock, on which a French corvette struck, is said to lie about N.E. by E., three-quarters of a mile from the Volunteer Rocks; therefore a good berth should be given to it, when hauling round into the sound. There are also some rocks off Cape Pembroke, the southern point of the sound; they extend about $1\frac{1}{4}$ mile out from the point; but when within the points, the sound, for about 7 miles, is perfectly clear, and may be worked up without danger. Be careful not to stand too close to Cape Nelson, off which some rocks lie. After working up about 7 miles, the Sea Lion Islands, or rocks, will be seen, with a patch of kelp about them, that extends to the point they lie off; and also to the southern end of them, and nearly midway between the Sea Lion Islands and the east point of Goat Island, another patch of kelp may be seen, on each side of which there is a passage; but be careful not to get in among the kelp,* as many dangers unknown may exist among it. In H.M.S. Tyne, we worked in, blowing fresh between the Sea Lion Islands and this patch of kelp, and tacked entirely by our approach to the kelp on each side. We worked up as far as to bring the eastern extreme of Goat Island to bear S.E.;

* The following extract, from Captain King's directions for the Straits of Magellan, will give the reader a correct idea of the dangerous nature of kelp:—"With daylight and clear weather, a vessel may close the shore without risk, because the water is invariably deep, and no rock is found, which is not so marked by sea-weed (or kelp, as it is generally called), that, by a good look-out at the mast-head, its situation is as clearly seen as if it were buoyed. By avoiding kelp, you are sure of having sufficient water for the largest ships on this part of this coast. At the same time it must be remembered, that kelp grows in some places from a depth of 30 fathoms, and that, on many parts of this coast, you may pass through thick beds of sea-weed without having less than 6 fathoms water. Still it is always a sign of danger, and, until the spot where it grows has been carefully sounded, it is not safe to pass over it in a ship. As an instance:—After sounding a large bed of this weed, in one of the Beagle's boats, and thinking it might be passed safely, a rock was found, not more than 4 feet in diameter, having only one fathom water over it."

small island of Ellice Island, West; kelp in midway, East; and the Sea Lion Islands, E.N.E., when, in consequence of not thinking it prudent in so large a ship to work up any farther, we anchored in $\frac{1}{2}$ less 9 fathoms, good holding-ground, and gave her good scope of cable.

With a fair wind, a ship may safely run inside all the islands, taking care to keep Goat Island on the port hand, when a good berth may be picked up in 5 fathoms, mud, with the settlement of Port Louis bearing W.N.W. one mile; western point of Ellice Island, N.E.; and western point of Goat Island, S.E. Although this anchorage is handy for the watering-place and settlement, in S.W. gales, it is not so smooth as the anchorage we had in the Tyne; but I would not, on any account, recommend any square-rigged vessel, larger than a ten-gun brig, working up farther than we did in the Tyne.

Water may be had at the settlement, by sending on shore your water-casks, and filling them. Cattle are plentiful here, and may be obtained in any numbers, by giving the guachos 24 hours' notice: the price we paid was ten dollars a head. The same abundance of wild ducks, geese, and snipe as at Port Egmont. There are also a great number of wild horses in East Falkland."

"FALKLAND SOUND, so called, being the channel between the two principal islands, East and West Falkland, is easily made out by a very remarkable rock, named the Eddystone, which lies about 4 leagues N. by E. from White Rock Point, and W. by N., 6 miles, from Cape Dolphin. It may be seen from the deck, in clear weather, 5 or 6 leagues. It makes, at first, something like a sail, and appears to be pretty bold all round. The land also, half-way between Cape Dolphin and the eastern entrance of the sound, is rather high and rugged; and White Rock Point is also remarkable, from some white rocks that lie off it: it is the western point of the entrance into the sound. The soundings, off the the entrance of the sound, are laid down very correctly in Lieutenant Edgar's chart, but his distance between Keppel Island Keys and the Eddystone is very much out. In H.M.S. Tyne we measured it, and made it as near as possible 35 miles, when Lieutenant Edgar makes it 52 miles in his chart. I also make the latitude of the Eddystone $51^{\circ} 10' S.$, which is about 6 miles farther north than laid down in the charts. West Falkland Island is generally higher than the East, and both are very uneven, and land much indented."—*Nautical Magazine*, 1834, page 388.

The WESTERN ISLANDS are very high, and in fine weather may be seen 50 miles off. The tops are entire rock, the lower parts rich and productive. On the S.E. side of the Grand Island, and at some few miles in the interior, natural curiosities are met with in the huge amphitheatres, large caverns, &c., in which beautiful specimens of stalactites have been found, which sufficiently prove the presence of lime in the country. Winds from the west and north are said to be the only check to agricultural labours. These winds, more or less, during the summer months, blow with great violence, from soon after sunrise till sunset.

REMARKS BY CAPTAIN GRANT, COMMANDER OF THE LADY NELSON.—"On the 21st of January, 1802, we came safely to an anchor in Hope Bay, or Little West Point Harbour, in the N.W. It was our intention, at first to touch at a cluster of islands to the westward, named New Islands, by the Americans, who are the most constant visitors of Falkland Islands. On New Islands are found plenty of goats and hogs. They lie about 30 miles S.S.W. by compass from West Bay, as a N.N.E. course carried us from them clear to the entrance of West Point. They are distinguished by a

particular saddle-island and a bluff, standing separately from each other. They are a little to the northward of Beaver Island, and may be easily found by the two remarkable islands just mentioned. As it is of the greatest consequence to mariners, when in want of water or refreshments, to obtain every possible information, in order to secure a port amongst this foul-weather group of islands, which purpose may be defeated by the smallest oversight, I think that a few remarks made in the run may not be unacceptable.

Having made New Islands, the westerly wind, which generally prevails, blowing very strong and in squalls, would not permit us to anchor; we were, therefore, under the necessity either of making the harbour of West Point, or running in the night through a passage among the Jasons, well known to be full of rocks and shoals, many of them not laid down in any chart. I have observed, that, 30 miles, N.N.E., by compass, brought us to the entrance of West Point Harbour. In this run there are, on the right hand, a few small flat islands, named Pass Islands. These ought to be kept on board, near enough to see the surf breaking on them; and, soon after, a remarkable island, with a steep side, will present itself, having the appearance of a split in the middle, which has given it the name of Split Island.

The split must be brought to bear S. by W. in running in, and N. by E. in coming out; observing this, a vessel will find itself in the fairway; and right ahead coming in, or right astern going out, a sight will be had of West Point entrance, making at first like three hummocks, to the right of which is the mouth of the harbour. The small harbour on the left is preferable to the larger one on the right, though anchorage may be found in both; but fresh water may more readily be had in the little harbour. Both these together form nearly an oval, divided by the passage which runs directly through where the tides of flood and ebb alternately enter. A vessel must therefore haul close round the rocks on the south side, to get into the little harbour for the ebb tide, with which she must go in, unless it blows very strong, so as to enable her to stem the flood, both tides running here with great rapidity, and when it blows hard, raising a confused sea. There is a sandy beach at the top of the harbour, off which a vessel may choose her depth of water to anchor in. In going out of the harbour the northern passage is most eligible; and a westerly wind, with a course N. by E., by compass, will carry a vessel out, provided she get under weigh, at the first of the ebb.

Five small perpendicular rocks, named the Needle Kays, appear when out, standing together, bearing N.E. by E., or thereabout, from the harbour's mouth. It is best to leave them on the right; but should there be little wind, and the tide strong, as was the case when we passed them, a vessel may go close to the right of them. The tide must be attended to, as it runs strongly betwixt them. The bottom is very foul, so that if an anchor is let go, it is a chance if it ever be recovered; and should the wind continue light, the tide of flood making, a vessel may anchor at Sedge Island, if she can get as far down, where 10 fathoms of water will be found, with a sandy bottom, within 2 or 3 miles of the shore. From Sedge Island a N. by E. course will carry a vessel clear out to sea.

It is proper to observe here, that if a vessel is obliged to leave the Needle Kays on her left hand, the nearer she keeps to them the better, and even to haul over on the larboard side, after she is past, as she will have the more room to weather a ledge of rocks, lying at a considerable distance out from Saunders' Point, as is shown in Lieutenant Edgar's chart. This passage is much preferable to running through the Jasons.

PORT EGMONT, on the north side of the West Falkland, may be descried at some distance from the sea, and may be entered by steering S.E. by S., which will lead in safely. On advancing, you will pass two rocky islets, which lie about 9 miles N.N.W. from the entrance; by passing within half a mile of the western side of these, the course in will be about S.S.E. $\frac{1}{4}$ E. The harbour is spacious, even to a fault; for its great size, during strong winds, renders communication with the shore inconvenient. The best anchorage is immediately off the creek, at the foot of the ruins, bearing N.N.W., in 9 fathoms of water, about three-quarters of a mile from shore. A reef extends from the east point of the creek, but may be known by the kelp which grows upon it. The ground is, however, so tough that the anchor will not be raised without great labour. The best watering-place in this port is at the head of the creek, and the most expeditious method of obtaining water is to fill the casks at low-water mark, and raft them off to the vessel. The tide, on the full and change, flows at 10 minutes past 7, and rises about 9 feet.

REMARKS BY MR. EDWARD GULLIVER, MASTER R.N.:—"PORT EGMONT is situated on the north side of the island, in a fine and spacious harbour, but difficult to be made out when first coming in from sea. The entrance may be known, in clear weather, by two small islets or kays, named by sailors who frequent that port, Keppel Island Kays. They are about 9 miles N.N.W. from the entrance; but, in consequence of the very thick fogs that prevail, and always with any wind that has nothing in it, they are difficult to be made out. They are to be left on the port hand going in. There are also two other low islands, that lie about W.N.W., 10 miles, from Keppel Island Kays, named Wreck and Ledge Islands, and are always to be left on the starboard hand going in.

The course into the harbour, after passing within a mile of the Keppel Island Kays, on the western side, is about S.S.E. $\frac{1}{4}$ E. There is no difficulty or danger in running for the harbour, after you have once got hold of the kays, by steering the above course, until you get within the points of the entrance of the harbour, where a sunken rock is laid down in Lieutenant Edgar's chart, just within the points, and nearly midway between them; but its existence appears to me to be doubtful, as I went away, sounding at low water, for the purpose of ascertaining its position, but could not find it, although I stretched across from point to point, and from kelp to kelp, off both shores, and found plenty of water, 7 fathoms close alongside the kelp on either shore, and gradually increasing to 16 and 17 fathoms, mid-channel.

There appears to be anchorage in every part of the harbour. The best is with the ruins of the old settlement bearing N.N.W., (they are just round the first point on your starboard hand, when within the harbour,) and the watering-place W. by S., in about 9 or 10 fathoms water, good holding-ground, and distant from the shore about half a mile. We anchored in H.M.S. Tyne, with the above bearings, in 11 fathoms, stiff mud, and rode out a heavy gale, without driving.

Water may be obtained here by sending on shore your water-casks and filling them, and either rafting them off, or parbuckling them into your boat as you please. There are also abundance of wild ducks, geese, both upland and kelp, and also snipe, to be found here. There is also an abundance of fish to be caught here with the seine; in one haul, we got a sufficiency for one ship's company.

The rise and fall of the tide at Port Egmont is about 9 feet; and it is high water, full and change, about 7 o'clock. I made Port Egmont, by mean of three chronometers, rated only three weeks before at Fort Vilganhon, Rio, to

be in longitude $60^{\circ} 15' W.$, which is about 34 miles to the westward of where Lieutenant Edgar places it.

The coast between Keppel Island Kays and the entrance into Falkland Sound is pretty bold, having sailed in H.M.S. Tyne twice along it, and at the distance of 45 and 6 miles from the land, without discovering any thing like broken water. I shall therefore recommend a stranger working up from Falkland Sound to Port Egmont, to stand within 3 or 4 miles of the shore, and not too far off, when he will have no difficulty in making out the islands that point out the approach to Port Egmont, as they are the first islands that are made in going to the westward from Falkland Island."—*Nautical Magazine* for 1834, page 387.

WEST POINT HARBOUR is the next principal anchorage to Port Egmont, situated at the western extremity of the southern land of Byron's Sound. There are two passages into it, one on the north, and the other on the south. The Jason Islands, lying to the N.W., are much in the way of the former, and these islands must be cautiously avoided in the night, and in unsettled weather, as the tide runs so strong and irregular amongst them as to render a ship almost unmanageable. The southern passage to West Point Harbour is easily made, by being careful, when coming from the westward, to haul close round West Point Island, so as to enter with it on the port side; for, by neglecting this precaution, with the wind from the westward, you may fall to leeward of the passage, and find it difficult to work out of the lee bays, into which a heavy swell frequently rolls.

The best anchorage in West Point Harbour is abreast of a small cove, on the south side, in 5 fathoms, over a bottom of sand and mud. The stream of tide here is scarcely perceptible, although it rises about 9 feet by the shore, and flows, on full and change days, at 7h. 30m. Water may be obtained at the head of the cove; and at the head of the harbour there is also a run of water, in which mullets may be caught by constructing a fish-weir. Water is abundant during the spring and autumn, not only here, but at Beaver Island, to the S.W., and at Little Port Egmont, in the west side of the passage to the greater port of the same name. At the west end of West Point Island is a rookery of the small albatross, which in October affords a good supply of eggs. Some brush-wood grows around the cove, but it is too small to be useful. In proceeding through the gut of West Point from the southward, with ebb tide, which runs to the N.E. with great rapidity, the great harbour, when opened, must be hastily entered, in order to avoid being swept to the northward by the stream.

From the south entrance of West Point Harbour, New Island lies S. $25^{\circ} W.$, 22 miles distant. Its western side presents a range of frightful precipices, one of which is 550 feet above the sea, which, in westerly storms, beats against its base with extraordinary violence. The eastern side, on the contrary, falls sloping into points, forming bays; and of these Coffin Harbour is the third from the south: this being the preferable anchorage, is the most to be recommended. In proceeding to it with a strong westerly wind, on rounding the north end of New Island, the sail on the ship should be particularly attended to, as the gusts of wind off the high land blow with great violence. With the wind at S.W. the south passage may be chosen; but it is to be noticed that a cluster, named the Seal Rocks, lie off the south end of the island, between which and the rocks is the best passage; and by keeping without the edge, off the kelp, which extends to a short distance from the end of the island, there is no danger. The small round isles, on the eastern side of New Island, have good channels within, and between them Ship Harbour may be easily recognised by its having a small isle, Ship Island, in it. Behind this

is the best anchorage, in 7 fathoms, in a bottom of stiff clay, with the south point of Ship Island bearing S.E., covering the S.E. point of the bay. The anchorage is perfectly land-locked. Good water may be obtained at a sandy beach, abreast of the anchorage, but it should be taken at 8 or 10 yards higher than the present pool on the bank, otherwise it may be brackish and undrinkable.

In sailing from the westward, in latitude $51^{\circ} 42' S.$ New Island may be readily distinguished, by its being the most northerly large island of that cluster, and by two islets lying off its north end, named Saddle Isle and North Head: between those and the north end of New Island is a clear passage, but in which, during strong winds, the tide ripples violently.

PORT EDGAR.—In 1830, H.M.S. *Eden*, commanded by Captain W. F. W. Owen, was forced into Port Edgar, by stress of weather, when on her way from Cape Horn to Rio Janeiro, in the month of March. Captain Owen describes it as a beautiful port, having many advantages for a settlement, with abundance of water, peat, good soil, and stock. The depth of water, in the middle of the entrance, is 18 fathoms; and the general depth in the port, between the two points, Leven and Eden, is 210 fathoms across, but 150 only clear of the weed off each point, and there is a depth of 4 fathoms alongside these points. No current of tide was observed during the last three days of the moon's first quarter, and a rise and fall of only 3 feet.

Captain Owen further observes, that a convenient port is much wanted on the southern coast of the West Falkland Island; for ships are frequently caught in furious southern gales, in rounding the Horn, and sometimes suffer much injury. Such a port as that of Edgar would not only afford such shelter, but is convenient to start from, with the first of a North or N.W. wind, which would carry them clear round. It would answer much better as a private speculation, in the hands of an independent company, and being a free port, than as a public concern. There is no timber to be seen, but Captain Owen is of opinion that English woods would grow in the sheltered valleys, and on the northern and eastern slopes of the hills.

The *Eden* was overtaken by a furious gale, between Beauchêne and Porpoise Point, with thick snow and hail-storms, when, not being able to weather Beauchêne, nor to see around, Captain Owen was obliged to seek a port. Two days afterwards, the *Durance*, a French frigate store-ship, was placed in similar circumstance, and just weathered Beauchêne.

SOUTH GEORGIA.

In 1675, South Georgia was discovered by Antony La Roche, and in 1775 was explored by Captain Cook, from whose description the following is taken:—"At 9 a.m. (January 14th) saw an island of ice, as we then thought, but at noon were doubtful whether it was ice or land. At this time it bore E. $\frac{1}{4}$ S., distant 13 leagues. Our latitude was $53^{\circ} 56' 30'' S.$, longitude $39^{\circ} 24' W.$ Several penguins, small divers, a snow petrel, and a vast number of blue petrels about the ship. We had but little wind all the morning, and at 2 p.m. it fell calm. It was now no longer doubted that it was land, and not ice, which we had in sight. At 4 in the morning of the 16th, wore and stood to the east, with the wind at S.S.E., a moderate breeze and fair; at 8 o'clock, saw the land extending from E. by N. to N.E. by N. At noon, observed in latitude $54^{\circ} 25' 30'' S.$, longitude $38^{\circ} 18' W.$ In this situation we had 110 fathoms of water, and the land extending N. $\frac{1}{4}$ W. to East, 8 leagues distant.

The northern extremity was the same that we first discovered, and it proved to be an island, which obtained the name of Willis's Island, after the person who first saw it. It is a high rock, of no great extent, near to which are some rocky islets. Willis's Island is situated in latitude 54° S., longitude $38^{\circ} 23'$ W.

As we advanced to the north, we perceived another isle lying East of Willis's, and between it and the main. This we named Bird Isle, on account of the vast number that were upon it. It is not so high, but of greater extent, and is close to the N.E. point of the main land, which we named Cape North. The S.E. coast of this land, as far as we saw, lies in the direction of $S. 50^{\circ} E.$, and $N. 50^{\circ} W.$ It seemed to form several bays or inlets, and we observed large masses of snow or ice in the bottoms of them, especially in one which lies 2 miles to the S.S.E. of Bird Isle. Seeing there was a clear passage between this isle and Willis's, we steered for it; and, at 5 o'clock, being in the middle of it, we found it about 2 miles broad. After getting through the passage, we found the north coast trended E. by N. for about 9 miles, and then East and East-southerly to Cape Buller, which is 11 miles more. We ranged the coast at 1 league distance, till near 10 o'clock, when we brought-to for the night, and on sounding, found 50 fathoms, muddy bottom."

Captain Cook proceeded to examine the eastern coast, and took formal possession of the land. The tide seemed to rise about 4 or 5 feet. High water at about 11h., full and change. The head of Possession Bay, as well as two places on each side, was terminated by perpendicular ice-cliffs, of considerable height. Pieces were continually breaking off, with loud explosion, and floating out to sea.

"The inner parts of the country were not less savage and horrible. The only vegetation we met with was a coarse strong-bladed grass, growing in tufts, wild burnet, and a plant like moss, which sprang from the rocks. Seals were numerous. Several flocks of large penguins were seen. The oceanic birds were albatrosses, common gulls, terns, shags, divers, &c. The land-birds were a few small larks. No quadruped was seen.

At the S.E. of Georgia is Cooper's Isle, a rock of considerable height, about 5 miles in circuit, and 1 mile from the main. At this isle the main coast takes a S.W. direction, for the space of 4 or 5 leagues, to the point named Cape Disappointment. Off that are three small isles, the southernmost of which is green, low, and flat, and lies 1 league from the cape.

The island seems to abound with bays and harbours, the N.E. coast especially, but the vast quantity of ice must render them inaccessible in the greatest part of the year; or, at least, it must be dangerous lying in them, on account of the breaking up of the ice-cliffs. It is remarkable that we did not see a river, or stream of fresh water, on the whole coast. I think it highly probable that there are no perennial springs in the country; and that the interior parts, as being much elevated, never enjoy heat enough to melt the snow, in such quantities as to produce a river or stream of water."

Clerke's Rocks are three or four rocky islets, which were subsequently seen at the distance of 2 or 3 miles; vast numbers of birds, especially shags, were about them.

South Georgia was visited by Captain Weddell, on his return from the southward, in March, 1823. On the 12th, at 3 p.m., the *Jane* and *Beaufoy* anchored in Adventure Bay, on the S.W. side of the island, in 7 fathoms, bottom of strong clay. The following is Captain Weddell's description:—"The island is about 96 miles long, and its mean breadth about 10. It is so indented with bays, that, in several places, where they are on opposite sides, they are

so deep as to make the distance from the one side to the other very small. Near the west end, in particular, there is a neck of this kind, about half a mile broad, over which boats are frequently transported. The tops of the mountains are lofty, and perpetually covered with snow; but in the valleys, during the summer season, vegetation is rather abundant. Almost the only natural production of the soil is a strong-bladed grass, as above-mentioned, the length of which is, in general, about two feet; it grows in tufts, on mounds 3 or 4 feet from the ground. No land quadrupeds are found here; birds and amphibious animals are the only inhabitants: of the bird tribe, the king-penguin is the most worthy of notice."

THE SANDWICH ISLANDS.

These islands were first discovered in 1775, by Captain Cook, on proceeding to the south-eastward from South Georgia. From the latitude of $59^{\circ} 30'$ S., longitude $29^{\circ} 24'$ W., the ship stood to the N.E. over a sea strewn with ice. "At half an hour past six next morning, as we were standing N.N.E., with the wind at West, the fog very fortunately clearing away a little, we discovered land a-head, 3 or 4 miles distant. On this we hauled away to the North; but finding that we could not weather the land on this tack, we soon after tacked in 175 fathoms of water, 3 miles from the shore, and about half a league from some breakers. The weather then cleared up a little more, and gave us a tolerable good sight of the land. That which we had fallen in with proved to be three rocky islets, of considerable height. The outermost terminated in a lofty peak, like a sugar-loaf, and obtained the name of Freezeland Peak. Behind this peak, that is to the East of it, appeared an elevated coast, whose lofty snow-clad summits were seen above the clouds. It extended from N. by E. to E.S.E., and I named it Cape Bristol, in honour of the noble family of Hervey. At the same time another elevated coast appeared in sight, bearing S.W. by S., and at noon it extended from S.E. to S.S.W., from 4 to 8 leagues distant; at this time the observed latitude was $59^{\circ} 13' 30''$ S., longitude $27^{\circ} 45'$ W. I named this land Southern Thulé, because it is the most southern land that has yet been discovered. It shows a surface of vast height, and is everywhere covered with snow. Some thought they saw land in the space between Thulé and Cape Bristol. It is more than probable that these two lands are connected, and that this space is a deep bay, which I named Forster's Bay.

At 1 o'clock, finding that we could not weather Thulé, we tacked and stood to the North; and, at 4, Freezeland Peak bore East, distant 3 or 4 leagues. Soon after, it fell little wind, and we were left to the mercy of a great westerly swell, which set right upon the shore. We sounded, but a line of 200 fathoms found no bottom. At 8 o'clock, the weather, which had been very hazy, clearing up, we saw Cape Bristol bearing E.S.E., and terminating in a point to the North, beyond which we could see no land. This discovery relieved us from the fear of being carried by the swell on the most horrible coast in the world, and we continued to stand to the North."

On the 2nd February, the Candlemas Isles were seen. They appeared to be of no great extent, but of considerable height, and covered with snow. A small rock was seen between them, and perhaps there may be more; for the weather

was so hazy that the sight of them was soon lost.* In closing his remarks on these lands, Captain Cook observes, "I concluded that what we had seen, which I named Sandwich Land, was either a group of islands, or else a point of the continent. For I firmly believe that there is a tract of land near the pole, which is the source of most of the ice that is spread over this vast southern ocean. I also think it probable, that it extends farthest to the North, opposite the Southern Atlantic and Indian Oceans; because ice was always found by us farther to the North in these oceans than anywhere else, which I judge could not be, if there were not land to the South; I mean land of considerable extent.

The brig *Tula*, of 148 tons, belonging to Messrs. Enderby, and commanded by Mr. John Biscoe, R.N., left the port of London on the 14th of July, 1830, on a South-Sea sealing voyage, but with special instructions from her owners, also to endeavour to make discoveries in a high southern latitude. She was liberally equipped with whatever appeared requisite or desirable on such an enterprise, and was accompanied by the cutter *Lively*, in the same employ, and attached to the *Tula* on the footing of a tender.

Extracts from Captain Biscoe's Journal.—"The two vessels, after touching at the Cape Verd Islands for salt, arrived off the Falkland Islands on the 8th November, and anchored in Port Louis, Berkeley Sound, on the 10th. Captain Biscoe speaks highly of the convenience of this port, for vessels round Cape Horn. Fish, bullocks, and fresh water can be easily procured, with a variety of antiscorbutic herbs, to use as vegetables,—the entrance being also clear, the anchorage good, and the depth of water considerable, close to the beach. On the 27th November, having completed their water, the *Tula* and her consort again proceeded to sea, and, on their way to Sandwich Land, kept a vigilant look-out for the Aurora Islands (before noticed in page 460). On the 10th December, in longitude $29^{\circ} 14'$ W., many icebergs were passed, which were conceived to be drifting between Sandwich Land and New South Shetland; and among them two vessels parted company, to their mutual great anxiety, and did not meet again till the 14th. On the 20th, an island was made, in latitude $58^{\circ} 25'$ S., longitude $26^{\circ} 55'$ W.; but its appearance being very discouraging,—in Captain Biscoe's words, 'terrific, being nothing more than a complete rock, covered with ice, snow, and heavy clouds, so that it was difficult to distinguish one from the other,—no attempt was then made to land on it. Proceeding to the southward, on the following day, another island was distinguished in the S.W., similar to the preceding one, which now bore W. by N., and the cutter was directed to examine both, in which her success was very incomplete, the boats not being able to effect a landing on either. These were the Montague and Bristol Islands of the charts, but which Captain Biscoe places 50 miles farther west than they are usually laid down. The thermometer stood at 29° in the air, and 31° in the water. A third, Friesland Island, was seen to the southward of them, and a fourth to the northward.

* Captain Morrell, in the schooner *Wasp*, on his voyage from the eastward, 28th February, 1823, says—"The cheering cry of 'Land ho!' resounded from aloft. This proved to be the *Candlemas Isles*, the most northerly isles of Sandwich Land; latitude $57^{\circ} 10'$ S., longitude $26^{\circ} 59'$ W. These two islands are of no great extent, but one of them is of considerable height; both are burning volcanoes, and the most western is burnt down nearly to a level with the sea. We continued examining these islands towards the South, until we arrived at the Southern Thulé; where, on the N.E. side of the westernmost island, we found a good harbour. In this group we saw nine burning volcanoes: fire in abundance, but no fuel for the *Wasp*. Three of these islands had vomited out so much of their contents, that their surfaces were nearly even with the water. All the islands are entirely barren. Those parts which have not been consumed by internal fires are very high, and covered with perpetual snows; the rest is broken land. The westernmost point of the Southern Thulé is in latitude $59^{\circ} 35' 10''$ S., and longitude $27^{\circ} 42' 30''$ W."

Several following days were spent in endeavouring to get to the southward, and, if possible, also to the westward, there being strong indications of land in that quarter; but these were all unsuccessful. The field-ice was either quite continuous and unbroken, for, where bays were formed in it, and entered, these were found open but a little way, and the vessels were obliged to return as they went in. Fortunately, the water was remarkably smooth, even when the wind, which hung to the westward, blew strong; and this circumstance both facilitated the manœuvring of the vessels, and encouraged their crews to persevere, by confirming their surmises as to the existence of land in the neighbourhood. On the 29th, at noon, the latitude observed was $59^{\circ} 11' S.$, longitude $24^{\circ} 22' W.$, but the wind blowing then hard from the S.W., further investigation in that quarter was abandoned. The islands before seen were again sighted, and the longitudes of their centres being further determined, and confirmed to be about $27^{\circ} W.$, sail was made to the eastward.

On the 5th January, 1831, the Tula and her companion were in latitude $59^{\circ} 9' S.$, longitude $21^{\circ} 52' W.$; and on the 7th, in latitude $59^{\circ} 35' S.$, longitude $20^{\circ} 21' W.$, closely skirting the field-ice the whole way, and examining every inlet, in hopes of finding a passage through it to the southward, and, as they hoped, to clear water. In this, however, they were constantly disappointed; and, on the contrary, on the evening of the 7th, says Captain Biscoe, 'my hopes in this direction were destroyed, for I suddenly found myself at the head of a bay of firm ice, with a view, from the mast-head, to an extent of at least 20 miles in every direction; and to the southward, the ice appeared so smooth and firm, that any one might have walked on it. The weather, too, was now so clear, that I am convinced, land of any considerable elevation might have been seen 80 or 90 miles. What further astonished me was, that there were no living animals of any kind about this ice, with the exception of one or two small petrels, not even penguins, which at other times had been very numerous. These circumstances almost convinced me that this ice must have been formed at sea,—the temperature of the water being then 30° and that of the air 31° , with frequent and very heavy falls of snow. Nevertheless, there were strong indications of land in the S.W., though none was actually within our horizon, and the water continued very smooth.' *Journal of the Royal Geographical Society. Vol. 3, page 105.*

SOUTH SHETLAND.

Mr. William Smith, commander of the brig Williams, of Blythe, was the first that saw this land, in the month of February, 1819. On the 19th, land or ice was seen in latitude $62^{\circ} 40' S.$, and near the longitude $62^{\circ} W.$, then bearing S.E. by S. about 2 leagues. The Williams was at this time on a voyage from Buenos Ayres to Valparaiso, and stretching far to the south. A combination of adverse circumstances, such as hard gales, with flying showers of snow, and fields of ice, prevented at this time the exploration of the coast; but on a subsequent voyage, from Monte Video to Valparaiso, in October of the same year, the Williams again made the land. Captain Smith says, "I, to my great satisfaction, discovered land on the 15th of October, at 6 p.m., in latitude $62^{\circ} 30' S.$, and longitude $60^{\circ} W.$, by chronometer, bearing distance about 3 leagues, hazy weather; bore up and sailed toward it; at 4 miles distant, sounded in 40 fathoms, fine black sand;—an island bearing E. by S. At S.E. by E. bearing, sounded in 60 fathoms, same bottom; hauled off during the night to the northward; at daylight stood in

for the land again, at 3 leagues distance. From the body of the islands sounded again, 95 fathoms, fine sand and oaze; at 8, weather clear and pleasant, saw the main land bearing S.S.E., distance from the islands about 3 leagues. Having ran as far as the cape, we found the land trend off to the N.E. Coasting to the eastward, and sounding, found it similar to the former, fine sand. A point bearing E. $\frac{1}{4}$ S.—hailed in for it; got the island to bear N.W., distance half a league; soundings regular from 20 to 35 fathoms, good bottom, sand and gravel. Finding the weather favourable, we let down boat, and succeeded in landing; found it barren, and covered with snow. Seals in abundance.

The boat having returned, which, when secured, made sail off shore for the ensuing night. In the morning altered the course, so as to keep the land to the southward in view. Having doubled the point above-mentioned, the land then took a south-easterly direction, varying to the eastward; weather thick and squally, with snow. I thought proper, having property on board, and perhaps deviating from the assurance, to haul off to the westward on my intended voyage. Strong variable winds. Made another cape, and could perceive some high land to the westward of it, and stretching in a S.W. direction. The weather becoming thick and squally, we made sail to the westward, having sailed 150 miles to W.S.W. The weather moderating, saw another head-land, bearing, by observation, E.N.E., distance 10 leagues. very high; observed in latitude $62^{\circ} 53' S.$ and longitude, by chronometer, $63^{\circ} 40' W.$ of Greenwich; named this Smith's Cape. Found the land to extend from the cape in a southerly direction. Shaped my course for Valparaiso, where I arrived on the 24th November, after a passage of 60 days from Monte Video."

They have been frequently visited since that time, for the purpose of taking fur-seals and sea-elephants, with which the shores abound. They extend from E.N.E. to S.S.W., over a space of nearly 300 miles, and consist of twelve islands of moderate extent, and a great number of rocks and cliffs. The largest of the islands, from east to west, are Clarence, Elephant, King George, Strachan, Mitchel, Sartorius, Livingston, Low, and Smith. The interior of these islands consists of high hills or mountains. A mountain on Smith's Island attains the height of 6,600 feet above the sea. They are almost entirely covered with snow all the year round, and only after mid-summer (in January) a few tracts, which are free from snow, are overgrown with lichens and mosses, in some places intercepted with a sort of straggling grass. The only inhabitants of these cold regions are numerous sea-fowls, as the albatross, penguin, &c., and the animals above-mentioned. The surrounding sea abounds in whales and fish. Most, if not all, of these islands are of volcanic origin. Captain Weddell observed smoke issuing from the rocks of Bridgman's Island; and the Island of Deception has the form of a horse-shoe, resembling in that respect the islands of the Pacific, which are formed by madrepores. The deep impression in the middle of Deception Island, which is 97 fathoms deep, and makes an excellent harbour (Port Foster), is doubtless a crater; and this island may, as to form, be compared with the Island of Nisita, in the Bay of Naples. The high rocks which enclose this crater are volcanic, rise to more than 800 feet above the sea, and are partly covered with ice. South of these islands is a wide strait, named Bransfield Strait. The coasts which constitute the southern shores of this strait appear to form an extensive country, which has lately attracted the attention of navigators, and rekindled the spirit of enterprise in Great Britain and other countries. In 1821, Powell discovered Trinity Land, south of the South Shetlands and the South Orkneys, between $60^{\circ} 30'$ and $61^{\circ} S.$

latitude, and $44^{\circ} 30'$ and $46^{\circ} 30'$ W. longitude. Palmer, an American, discovered a coast-line west of Trinity Land, which is named Palmer's Land; and the Russian navigator, Bellingshausen, discovered Alexander's Land, S.W. of Palmer's Land. All these lands are south and west of the South Shetland Islands. In 1823, Weddell tried to find land east of the meridian of these islands. He did not find land, but he succeeded in advancing as far as $74^{\circ} 15'$ S. latitude, where he found a sea clear of ice.

On the 12th February, 1832, Captain Biscoe, in the *Tula*, was coming from the westward, in latitude $66^{\circ} 27'$ S., longitude $81^{\circ} 50'$ W., many birds were seen (albatrosses, penguins, cape-pigeons, &c.), with several humped and finned-back whales; and no fewer than two hundred and fifty ice-islands were counted from the deck. On the 15th, land was seen, bearing E.S.E., but at a great distance, the latitude being then $67^{\circ} 1'$ S., longitude $71^{\circ} 48'$ W., and sail was made to close it. On the following morning it was ascertained to be an island, and named Adelaide Island, in honour of her Majesty; and, in the course of the ensuing fortnight, it was farther made out to be the westernmost of a chain of islands, lying E.N.E. and W.S.W., and fronting a high continuous land, since named Graham's Land, which Captain Biscoe believes to be of great extent. The range of islands has been also since named Biscoe's Range.*

ADELAIDE ISLAND has a most imposing and beautiful appearance. with one high peak shooting up into the clouds, and occasionally appearing both above and below them; and a lower range of mountains, extending about 4 miles from north to south, having only a thin covering of snow on their summits, but towards their base, buried in a field of snow and ice of the most dazzling brightness, which slopes down to the water, and terminates in a cliff of 10 or 12 feet high, riven and splintered in every direction, to an extent of two or three hundred yards from its edge. At a distance of 3 miles, no bottom could be found with 250 fathoms of line, and round all the islands the depth of water was considerable. One, named Pitt's Island, in latitude $66^{\circ} 20'$ S., longitude $66^{\circ} 38'$ W., has many bays, and forms, with the main land behind, a good harbour for shelter, but the bottom is rocky. No living animal was found on any of these islands, and not many birds, although only a few miles to the northward they were very numerous.

On the 21st February, Captain Biscoe succeeded in landing on what he calls the main land, and took formal possession of it,—the highest mountain in view being named Mount William, after his Majesty, and the next Mount Moberly, in honour of Captain Moberly, R.N. The place was in a deep bay, 'in which the water was so still, that could any seals have been found, the vessels could have been easily loaded, as they might have been laid alongside the rocks for the purpose. The depth of water was also considerable, no bottom being found with 20 fathoms of line almost close to the beach; and the sun was so warm, that the snow was melted off all the rocks along the water-line, which made it more extraordinary that they should be so utterly deserted. The latitude of Mount William was determined to be $64^{\circ} 45'$ S., longitude $63^{\circ} 51'$ W. Captain Biscoe, after this, repaired to the South Shetland Islands, where he was driven ashore, lost his rudder, and

* It is probable that the coast which Biscoe saw was that which had been seen in 1598, by Dirk Gherritz, a Dutchman. His vessel, which belonged to a Dutch fleet, commanded by James Mahu, on leaving the Straits of Magallhaens for the Pacific, had been separated from the other vessels, and carried by winds and currents as far south as 64° , where he found a lofty coast, which Gherritz compared with that of Norway. He was unable, however, to determine the position of this newly-discovered coast.

very narrowly escaped shipwreck."—*Journal of the Royal Geographical Society of London.* Vol. 3, page 110.

GENERAL REMARKS.—All the northern part of the coasts of South Shetland abounds with islets, rocks, and breakers, while the southern coasts are entirely clear of these dangers, but in the early part of the spring, the southern sides are blocked with ice, which comes from the land to the south of, and opposite to it. When you come up as far as the south beaches, you again meet with rocks and breakers.

The best harbour is formed by DECEPTION ISLAND, which island, or shell of an island, is certainly one of the most singular productions of nature. The land is high, and bold on every side, with a narrow opening, of about a cable's length, on its S.E. side, leading to a very capacious basin. The isle is a volcanic production; its shores on either side are bold and pumice-stone, with other substances, indicate its origin. There are also several hot springs, some of which are of a temperature sufficient to boil an egg. The basin is 5 or 6 miles across. At its mouth you will have 3, 4, and 7 fathoms of water, and increase very rapidly as you enter; from 7 fathoms you increase to 10, then 18, 27, 32; and then, a little within this, you will get no bottom at 60 fathoms. On the N.W. side of the basin there is a very fine cove, capable of containing several vessels, in about 4 or 5 fathoms of water, and a bottom of good clay. From the entrance of the basin up to the cove the course is N.W. by W.

BRIDGMAN'S ISLAND.—Near the centre of the Shetland group is Bridgman's Island, in latitude $62^{\circ} 4' S.$, longitude $57^{\circ} 0' W.$, apparently another volcanic production. The figure of the island is nearly round; it is very small, but 400 feet in height, partaking of the form of a sugar-loaf. Captain Weddell, on passing within 200 yards of it, observed smoke issuing through the fissures of the rock, and apparently with much force.

TIDES.—On the north coast of South Shetland the tides are very irregular, being sometimes high water for 24 hours together; at others, it flows tide and half tide, and remains for about 3 or 4 hours high water, and then ebbs again, though there is, in general, one flood and one ebb every 24 hours. Gales of wind raise the tide sometimes much above its natural level, which may account, in some measure, for many skeletons of whales which lie in many places 12 or 14 feet, at least, above high water mark, and many yards from the sea-shore. In Blythe Bay (Desolation Island) an easterly gale will raise the water considerably above its common height; and the brig Lady Troubridge, of Liverpool, that drove on shore on Christmas-day, 1820, was found, in the next season, forced up nearly high and dry. Near the mouths of the straits the tides run very strong, and in various directions, which renders the navigation, in light winds, both unpleasant and unsafe. The flood-tide on the coast sets to the eastward.

In a S.W. gale, the tide runs directly to windward, a full league from the coast, at the rate of two or three knots; and, *vice versa*, to the eastward again, when the brig Williams, and the ship Indian were at once blown out of Blythe Bay, with a gale of wind from the eastward. The Indian drove 10 leagues to the westward, and the Williams, though lying-to, drove up 7 leagues to the eastward, and dead to windward two-thirds of the way, which evidently showed, that the two vessels had received the impulse of two contrary streams.

From the observations which have been made, it is conjectured that the flood and ebb, in moderate weather, runs backward and forward in the offing, as far as 2 leagues from the outer points of the land, taking the sweep of the bays; but, be it understood, that it sometimes runs much longer both ways,

and likewise stronger than it does at others. Its distance from the coast also varies outside these limits; the current has been found to run, at least, a knot, in the same direction as the wind blows.

From the above remarks, it clearly shows, that it is not easy to give any satisfactory account of the tides, so as to reduce them to any thing like a regular theory. One circumstance, however, may be worthy of notice; fragments of the wrecks of the *Cora* and *Clothier* were all invariably drifted to the westward. Cape Shirreff and the north beaches were scattered all over with them, and not one single particle was ever found to the eastward. The *Cora's* were easily identified, being either cedar or mahogany. On the south side of the land, it is pretty generally admitted, that the motion of the water is, on the contrary, toward the eastward, and carrying with it vast quantities of ice, in the direction of the coast, toward Sandwich Land.

WINDS.—“Nearly all the misfortunes that have happened in South Shetland have been in gales of wind from the eastward, which frequently prevail here, and blow with tremendous fury, generally accompanied with heavy falls of snow. No less than seven vessels have been lost, and all with easterly gales, excepting the *Clothier*, an American; which struck on a sunken rock. In the years 1820, 21, and 22, four-fifths of the gales were from the eastward,—though we had all looked for harbours sheltered from the westward, under the impression that we should have most to fear from that quarter.

In fine weather, the winds from the S.W. and N.E. are about equal, not keeping long in either quarter. Indeed, with very few exceptions, the winds are always along the land, which renders this coast far less dangerous, when under sail, than it would otherwise be. The south-westerners here, much like the north-westerners at home, are attended with a fine clear sky, and generally sweep away all the fog and sleet of the light north-westerners. In two seasons, I recollect only one gale from the N.W., which was very heavy. I was then in Blythe Bay, and it was perfectly smooth, though the sea outside was, in a manner, overwhelming.

It would appear, if a parallel may be drawn from these two seasons, that gales of wind on the land are very unfrequent. I have noticed that the wind on the land is generally light, with thick dirty weather; however, the gales of wind, after the middle of February, begin to increase in strength, and it is then not worth any one's while to stop longer on the coast. Were I bound round Cape Horn, and to meet with adverse winds, I would not keep hugging the wind, and going about with every slant, but check the topsail yards in, and keep my reach to the southward, when I should be sure to be not long without an easterly wind, with which I could soon get sufficient westing (the degrees of longitude being so short, and such an offing from the western part of Terra del Fuego, as to make for me a S.W. wind a fair one. The danger of falling in with ice is almost chimerical, there being no low drift ice on the north side of Shetland; and in two seasons, I only saw three ice islands.”—*Captain Robert Fildes, of Liverpool.*

ON APPROACHING SOUTH SHETLAND FROM THE NORTHWARD, Livingston's, or the main island, will appear in mountains of vast height, and covered entirely with snow, the base of them terminating in perpendicular ice-cliffs. On this side of the group, in latitude $62^{\circ} 20' S.$, and longitude $59^{\circ} 45' W.$, is a small isle, named Table Island, which is by far the most remarkable hereabout, and will always be an infallible mark for any one approaching, as it is not possible to mistake it for any other land. All strangers, therefore, should make this their landfall, particularly in the early part of the season, for then the land is not so easily made out, it having a great quantity of snow

upon it, which may at times deceive those best acquainted. Its top appears as level as a bowling-green, and its sides resemble a wall. In the upper part of the N.E. end of it is a chink or division, which from some situations may be seen.

SECTION VII.

TRACKS ACROSS THE ATLANTIC,

AND

DIRECTIONS FOR VARIOUS HARBOURS ON THE NORTH AMERICAN COAST.

ENGLAND TO BRAZIL. ●

Vessels leaving the English Channel are recommended to shape their course so as to pass well to the westward of Cape Finisterre (latitude $42^{\circ} 54'$, longitude $9^{\circ} 15'$) at from 30 to 50 leagues. Passing the coast of Portugal steer for the Madeira Islands, and endeavour to make Porto Santo, which lies in latitude $33^{\circ} 3'$, and longitude $16^{\circ} 18'$, as by getting sight of this island you will proceed on your voyage with greater certainty. In the Bay of Biscay, and to the westward of Ushant, the current sets to the westward, at times, in winter, but in summer it generally sets N.E. and Easterly. It is often found to set eastward from March to November, particularly when westerly winds prevail; and off Cape Finisterre, and near the south part of the bay, it sets mostly along the coast to the eastward; and, along the east side of the bay, it sets to the northward, parallel to the west coast of France. Caution is therefore requisite, with a westerly wind, in standing to the southward to weather Cape Finisterre; for, should a ship's position not be ascertained by chronometers or lunar observations, it would be imprudent, in gloomy blowing weather, to stand to the southward in the night, if not certain of being well to the westward of the cape.

Sometimes gales of wind from W.N.W. blow into the Bay of Biscay, continuing for several days; and some of the outward-bound East India ships have been driven far into the bay during these gales, in April and May. If a ship has the misfortune to lose any of her masts, during one of these gales, the heavy sea rolling in from N.W. and W.N.W., with an easterly current, would unavoidably force her to leeward, and, should the gale continue long and severe, she might be in danger of drifting on a lee-shore.

During the winter months, those who are not desirous of stopping in Funchal Road should pass to the westward of Madeira, at any convenient distance, not less than 6 or 7 leagues, as strong westerly gales prevail in November, December, and January, which produce severe squalls, and eddy winds, near the the island on the east side.

Having sailed to the westward of Madeira, it is advisable to pass to the westward of the Canary and Cape Verde Islands, keeping at any discretional

distance, or barely in sight of them. By this course you will not only avoid the light winds and calms which frequently prevail among these islands, as well as the several dangers reported to be in the vicinity, but may reasonably expect a steadier breeze; although there are instances of ships after passing in sight of the Canaries, to the westward, having the wind from that quarter, which obliged them to pass to the eastward of the Cape Verde Islands.

Leaving the Canary and Cape Verde Islands steer on southerly, and endeavour to cross the Equator, between the meridians of 18° and 23° W., but by no means farther to the westward, lest the westerly current, which sweeps round Cape St. Roque, lead you into danger.

In approaching the coast of Brazil, considerable attention should be paid to the season of the year; periodical winds prevailing from S.S.E. and S.E., from March to September, the current then running northerly; but between September and March the wind blows from the N.E. to E.N.E., and it then sets to the southward. It is, in consequence, advisable to make the land to windward of the port bound for, and according to these periodical winds, which commonly govern the current when the sun is in the northern hemisphere; the winds on this coast will incline more from the south-eastward, than in the opposite season (when the sun is to the southward of the Equator) for then they prevail to the eastward.

It also appears that, in any season of the year, if the coast be not made to the northward of Cape St. Augustine, there will be no difficulty in getting on to the southward; for ships which made the land in latitude 7° or 8° , even in the unfavourable season, by making a few tacks, always readily proceeded to the southward, and experienced little or no northerly current: nevertheless, in a bad sailing ship, it would be highly imprudent to make it to the northward of Cape St. Augustine, especially between the months of March and October; and certainly it should never be made to the northward of Cape Ledo, or near Cape St. Roque, on account of the S.E. winds and W.N.W. currents, before-mentioned, which might fatally sweep you round to the northward of the cape.

Every navigator should, therefore, be attentive to the time of year he makes the coast of Brazil, there being a kind of monsoon, or trade-wind, blowing from the N.E. and E.N.E., with a current setting south, from the month of September to March; while from March to August, the winds are from the S.E., E.S.E., and S.S.E., the current then setting north; according, therefore, to the seasons, he should run into a higher or lower latitude than the port he is bound to.

From Cape St. Roque to Cape St. Augustine the land may be approached by soundings of moderate depth, and gradually lessening as you approach the shore.

A strong southerly current commences from Cape St. Augustine, about the middle of October and continues until January; no particular current succeeds till the month of April, when, generally, about the middle of that month, a strong one sets in northerly until July, when it again subsides until October; near the shore the wind, for nine months in the year, generally blows north-easterly in the morning, and north-westerly during the night, continuing gradually to change along the coast, until, at Rio Janeiro and the River Plate, it becomes a regular land-breeze from evening to morning, and throughout the day the reverse. From the end of February till the month of May the wind is mostly from the south, blowing strong and stormy, with frequent squalls from the S.W.

COAST OF BRAZIL TO THE CAPE OF GOOD HOPE.

The directions given for this route by Captain Horsburgh, are as follows :— During most months of the year the south-east trade fails about the southern tropic, or 2° or 3° beyond it, when the wind is found to veer from eastward to north-east, and northward; the northerly winds prevail more than any other in the vicinity of the south-east trade, and as far as latitude 34° or 35° S., from the coast of Brazil to the meridian of London, or a little farther eastward. When therefore a ship departs from the Brazil coast, or has got to the southward of the south-east trade, she will most probably, in almost every month of the year, meet with brisk winds veering from N.E. to N.W., and sometimes to W. and W.S.W., which will carry her quickly to the eastward. These variable winds keep mostly between north-east and north, and are attended with smooth water and fine weather. When cloudy weather accompanies these northerly or north-east winds there is a risk of a sudden shift to the south-west or south.

A ship, by running to the eastward, in the track of these winds, gradually increasing the latitude as she proceeds, will often make greater progress than by going to 38° or 39° S. in search of westerly winds. Although here the westerly winds prevail during most months of the year, they are often very unsettled, completing a revolution round the horizon, coincident with the course of the sun every two, three, or four days, with intervening calms, particularly when the wind is from the south-west quarter. It seems, therefore, inexpedient to increase the latitude more than 35° S., till a ship has reached the meridian of London; she may then gradually proceed into 36° or 37° S., as she approaches the Cape, for the southerly winds which prevail around the cape-land from January to April (and at times in other months) extend far to the westward.

In February and March these southerly winds are frequently experienced between the Cape and the meridian of London, on which account it is prudent for a ship bound to it in this season, to increase her latitude to 35° or $35^{\circ} 30'$ S., when she draws into east longitude. She ought then to keep in about $35^{\circ} 30'$ S., if possible, till the Cape is nearly approached, to prevent being driven to northward of Table Bay by the southerly winds.

From December to April, if it is not intended to touch at the Cape, a ship should get into latitude 37° or 38° S., about the meridian of London, and keep in 37° and 39° S. in running down her easting; for the winds will be found as variable for this purpose in 38° or 39° S., or probably more so, than if she were in a higher latitude. In passing the bank of Cape Agulhas, the stream of current setting westward ought to be avoided by keeping at least in latitude 37° S.; and she should not go to the northward of this parallel in running down her easting, after passing the Cape, or she may be greatly retarded by the south-easterly winds which prevail in these months, to the northward of latitude 35° or 36° S.

CAPE OF GOOD HOPE TO ST. HELENA, AND THENCE HOMEWARDS.

Having rounded the Cape of Good Hope, a direct course for St. Helena is about N.N.W. to N.N.W. $\frac{1}{4}$ W., 566 leagues; it is however advisable to steer about N.W. by N. until a considerable distance is gained from the western

coast of Africa, because you are liable to encounter N.W. and W.N.W. squalls at times, particularly when near the coast; it is true they do not often happen, but they have sometimes been experienced in both seasons. A direct course about N.N.W. $\frac{1}{4}$ W. or N.N.W. will then be fair for St. Helena.

If the wind be strong, veering to the E.S.E., allowance for a leeward current should be made, particularly if the weather should happen to be cloudy and the longitude uncertain. In such case it will be prudent to make the latitude of the island several leagues to the eastward of it; and haul round the N.E. or Sugar-loaf point for the anchorage, as described in the particular directions for St. Helena.

Leaving St. Helena, a direct course N.W. by N. may be steered for Ascension Island, and in this part of the passage a steady S.E. trade generally prevails all the year, with westerly current at times. Ascension may be passed on either side at any convenient distance, but it is usual to pass to the westward of it, at from 3 or 4 to 10 or 12 leagues distance. Proceeding from Ascension towards the Equator, steer N.N.W. or N. by W. $\frac{1}{4}$ W., and endeavour to cross it between the meridian of 18° and 25° W., taking care you do not get to the eastward of the former, nor westward of the latter. Should the sun be in the northern hemisphere, cross it, if possible, between 21° and 23° , as variable light winds extend a great way out from the coast of Africa in July, August, and September, whilst the sun is returning from the tropic of Cancer to the Equator.

To sail from the Equator to the northward, a N. or N. by W. course may be steered, if the southerly winds become light, in order to reach the N.E. trade as soon as possible; but if variable light breezes are found to continue far to the northward of the Equator, a berth of 40 or 50 leagues at least ought to be given to the Cape de Verde Islands. In crossing the N.E. trade a ship's sails should be kept well filled to enable her to gain speedily to the northward. In this route the Sargasso Sea, is usually first seen about the parallel of 24° or 25° N., extending sometimes as far to the northward as 40° or 41° N. When ships get to the northward of the northern limit of the trade-wind in latitude 30° or 32° N. their longitude will be generally from 39° to 42° W.

Should the wind veer to the N.W. on approaching the Azores, you may pass through one of the channels of these islands, and thence pursue a course for the English Channel according to circumstances. It is seldom advisable to pass to the eastward of the Azores, because northerly winds, which often prevail between them and the Portuguese coast, are unfavourable for pursuing a direct course towards the Channel; it is, therefore, recommended to pass round to the westward, though it has sometimes happened that vessels sailing to the eastward of the Azores have met with S.W. and W. winds, and reached the channel sooner than others, which went round to the westward of those islands.

TO SAIL UP THE ENGLISH CHANNEL.

In all previous instructions for entering the British Channel, it has been directed for ships to get into the parallel of $49^{\circ} 25'$ to $49^{\circ} 30'$; but this, as Captain Horsburgh very justly remarks, seems intended for ships navigating by dead reckoning, and even in that respect are improper; because ships endeavouring to get into that parallel from the southward, would be under the necessity of making a more circuitous route, than would be requisite, in

steering a direct course for the Lizard Point; and as S.W. or westerly winds are prevalent for the most part of the year, there is no necessity to steer so far to the northward, which, in war time, would be very likely to run the risk of being captured, added to which is the very probable danger of meeting with a sudden shift of wind, when nearing the Scilly Islands, and thereby get driven into the St. George's Channel; these and many other reasons of equal weight that could be adduced, is sufficient to prove the error of following such directions. What Captain Horsburgh advises (and his long experience, ability, and elevated station, eminently qualify him to give the best directions) is to shape a direct course, after passing the Azores, towards the Lizard Point, inclining a little to the northward, or otherwise as circumstances or winds may render most advisable. It is highly necessary here to offer some remarks on the current, which occasionally sets athwart the entrance of the English Channel to the N.W. and W.N.W. from the Bay of Biscay, and which, from not being noticed, has often been productive of very serious mischief. It is a temporary stream, and not perceptible, unless there has been a continuation of westerly and south-westerly winds; this forces an unusual quantity of water into the bay, which makes its escape by setting to the N.W. or W.N.W., at some distance to the westward of the Isles of Ushant and Scilly; it may be presumed that the stream generally goes off to the N.W. about the parallel of 51° , between longitude 14° and 15° , and of course the velocity will be proportionate with the direction and strength of the wind.

As a general remark, it may be observed, that the current sets to the westward, at times in the winter, but in summer generally to the N.E. and easterly. The middle of the stream always preserves its original course, which is about N.W. by W. much longer than the edges, whose course is on the eastern side more north, and the western side more west; for which reason the northern current has more force near to the west of Scilly, than farther to the westward; and therefore it is evident that ships which cross the current in an oblique direction, steering a true E. by S. course, or more southerly, or with light winds, will be more affected by it than those which steer more directly across it. On approaching the Channel in the night time, if there should have been a continuance of westerly winds, it would be dangerous to run eastward, notwithstanding a good observation of latitude may have been made, for in that case a ship might be drifted by the current, from what would be considered a safe parallel to the parallel of the Scilly Rocks; in order to avoid any danger, it is best to keep at the highest in $48^{\circ} 45'$; because the whole effect of the current in the worst situation, may be felt if you should get into the parallel of $49^{\circ} 30'$; whereas from the current in $48^{\circ} 45'$, a wind from the southward will set the ship into the Channel.

Near the entrance of the Channel N.E. and northerly winds generally prevail from January to May, and from May to December, S.W. and westerly winds are mostly experienced; sometimes southerly and N.W. winds prevail, but they are seldom of any long continuance, and generally veer to the westward, although sometimes they veer to north and north-eastward. Therefore from January to May, when N.E. or northerly winds are prevalent, it will be best to get into about 49° , when approaching the meridian of Cape Clear, from whence an easterly course ought to be followed for the Lizard, and if the wind should blow steady from the northward, the parallel of $49^{\circ} 30'$ may be preserved in passing the Scilly Islands. If from April or May to about December, when S.W. and westerly winds mostly prevail, you should get into the latitude of 48° , when you reach the meridian of Cape Clear, and from this situation a direct course may be steered for the Lizard Point.

The Ushant Light is in latitude $48^{\circ} 28' 8''$ N., and longitude $5^{\circ} 8' 19''$ W. and is fixed at 272 feet above the sea, visible 18 miles. Near the island the soundings are about 54 fathoms. High water half-past 4, and the variation $25\frac{1}{2}$ W.

The St. Agnes Light, Scilly Islands, is in latitude $49^{\circ} 58' 37''$ N., longitude $6^{\circ} 20' 39''$ W.; it is a revolving light, and obscured every minute.

The allowance for variation on entering the British Channel, may be about 26° W., until near the Scilly Islands; 25° in running up to the Isle of Wight, and 24° from thence to Dungeness. In steering up Channel, however, with the ship's head easterly, the west variation will very likely be from 1° to 4° less than the true variation, and the same access of west variation will probably be experienced if the ship's head be to the westward.

It is an opinion of Captain Flinders, founded on experiment, that the magnetism of the earth, and the attraction of the iron in a ship, acts as a compound force, in producing the error of variation, by the change of a ship's head, and the error at any direction of the ship's head will be to the error when her head is east or west, at the same dip of the needle, as the sine of the angle between the ship's head and magnetic meridian is to the sine of 8 points or radius.

Strong south-westerly winds force an accumulation of water into the British Channel, and the tides are then much higher than at any other time; the velocity of the flood is also increased by these winds, and continues an hour or more longer than usual, the ebb being greatly repressed by them; from which it happens that ships running up Channel with a strong S.W. gale, are liable to be ahead of their reckoning, unless a proper allowance is made; for by entering into the first of the flood, and running at the rate of 8 or 10 knots by the log, they will carry the tide with them 10 or 11 hours, which may carry them all the way from the Start up to Beachy Head, or even to Dungeness.

If uncertain of your latitude on steering into the Channel, you ought to keep well to the southward of the Scilly Islands on passing them, and in the night, or foggy weather, not to shoalen your water less than 60 or 62 fathoms; you will have 70 fathoms yellow or white sand abreast of them to the southward in latitude $49^{\circ} 20'$. The light on St. Agnes may be seen at a considerable distance, but there are many dangerous rocks stretching from it for about 5 miles to the W.S. Westward, having very irregular soundings of from 40 to 50 fathoms, about 1 or 2 miles S.W. from them, and a rocky spot with overfalls, shoaling in from 50 to 16 fathoms, about 5 miles S.S.W. from them.*

If you should happen to get into latitude $49^{\circ} 25'$, and running for the Channel, and have run so far to the eastward as to shoalen your water to 66, to 65, or 67 fathoms, and the soundings are shells and small yellow stones, or red stones or red sand, you may thence conclude that you are abreast of Scilly; or if you have 68 fathoms, white sand with gray specks, and sometimes shells and stones, Scilly will then bear about N.E. from you, distance 10 leagues. Your soundings will always inform you whether you are to the northward or southward of Scilly. In the latitude and to the northward of Scilly you will find it so oazy and muddy, upon the edge of the ground, that it will very frequently be washed off the lead. The soundings near Scilly are very different from all others in this latitude; pieces of rotten rock as broad as a small bean, and of a stone colour, will come up with the lead, which will not be the case anywhere else in the same parallel. More to the southward

* See the chart of the Scilly Islands published by Mr. Inray.

you will have deeper water, with fine sand, interspersed with black specks like ground pepper. Abreast of Scilly, in the latitude of $49^{\circ} 20'$, you will have 70 fathoms, branny or yellow and white sand; and, to the eastward of Scilly, in the latitude of $49^{\circ} 8'$, you will have 56 or 58 fathoms, coarse sand. You should then steer more to the northward, and endeavour to make the land about the Lizard; you may safely make it in the night as well as in the day, if the weather be clear, for the lighthouses stand so high, and the coast is so clear, that you may, without danger, come within half a mile of the point. If the weather prove so thick that you cannot safely make the land, come no nearer to the Lizard than 45 fathoms, for, in that depth, you will not be more than 3 leagues off the point; you soundings there will be pebble stones and scallop shells.

The southern point or Little Sole Banks lies at the distance of about 50 leagues to the westward of Ushant, in the latitude of $48^{\circ} 22'$, longitude $8^{\circ} 50'$. They stretch from thence about 11 leagues to the N.N.W., and are about 4 leagues in breadth, having a depth from 60 to 80 fathoms, fine sand. Ushant should not be approached, in foggy weather, nearer than 64 fathoms, as there is a depth of 60 fathoms about 3 leagues from the island. You will have 70 fathoms about 8 leagues west from Ushant; and at 26 leagues distant, in the same latitude as Ushant, 85 fathoms, and 12 leagues further there are 74 fathoms. The ground is of various descriptions, but generally grey or brownish sand, with broken shells. The Great Sole Banks are about 5 leagues broad, and the body of them lies in latitude 49° , longitude 10° , with 60 to 70 fathoms; on either side there are 90 fathoms, fine sand. It is possible, while running along this parallel, you may shoalen your water to about 6 fathoms, and, after deepening to the former depth, find shoal water again, after running 3 or 4 leagues; but you may be certain of having the Channel open when you get in from 90 to 65 fathoms, fine sand and black specks, and with this ground you may approach to within the distance of 14 leagues to the S.W. of Scilly. When you are to the southward of the fair-way, it has generally been observed that the ground is reddish, coarse, and rather stoney, and the sea has a peculiar appearance towards the French coast, from the tide whirling round in many places; but when in the fair-way, and the Channel open, you will have fine light coloured and grey sand, with a depth of from 100 to 80 fathoms; and in 75 and 70 fathoms, brown sand and black specks. After passing the Scilly Islands you must steer rather more northerly to make the Lizard, if the wind is favourable; but in thick foggy weather, or with scant southerly winds, you ought not to approach that point in less than 45 fathoms; you may then be about 3 leagues off. Close in with the Stag's Rocks, lying off the front of the point, there are from 10 to 12 fathoms. As the soundings are from 30 to 40 fathoms, about 2 miles from the point, there will be no danger in approaching within that distance in the day time, and in fine weather in the night. When the two lights are conspicuous they may be made with safety. The advantage of making land about the Lizard is, that you may know how to steer in advancing upwards, if thick weather should come on, and if this land cannot be distinguished, you must endeavour to get a sight of the Eddystone, or the land over the Start Point, which is a sloping oblong hill. By not attending to this mode many ships have got over on the French coast, and have been lost; for there is a strong indraught of the tide between the Coast of France and the Islands of Guernsey and Jersey, which has often proved fatal to ships steering up Channel, that have not kept within a proper distance of the English coast.

Off the Lizard Point the stream of flood runs to the eastward, in mid-

channel, until nearly eight hours, at full and change of the moon, and it is then about half ebb on the shore.

The course and distance from the Lizard to the Start are E. by S. southerly, about 21 leagues; and between the Lizard and Eddystone a ship may stand off to 50, and inshore to 42 fathoms, but not nearer, by reason of there being 36 fathoms in the stream of the Eddystone; but between the Eddystone and the Start you may approach the shore to 32 fathoms, and stand off to 46 fathoms.

The Hand-deeps bear from the Eddystone N.N.W. $\frac{1}{4}$ W., 3 miles; and the East Ruts E. by S. $\frac{1}{4}$ S., 11 miles.

From the Start to the Bill of Portland the course and distance are E. $\frac{1}{4}$ S., 16 leagues; but, from the Start, a course must be pursued as circumstances render most advisable, borrowing towards the English coast, with northerly winds, or keeping near mid-channel, with S. and S.W. winds; and, should you have passed the Start, at the distance of about 4 leagues, it will be proper, with a fair wind, to steer an E. by S. course, which will, in general, carry a ship direct up until abreast of Beachy Head,* which a large ship ought not to approach nearer than 18 fathoms, on account of the shoals that lie to the S.E. and Eastward of it. After clearing these you must haul up E. and E.N.E. for Dungeness, by which the Ridge and Varne will be avoided in proceeding towards the South Foreland.

As the water in the Channel is frequently thick and foggy, too much caution cannot be used, particularly with variable winds; you may keep in from 30 to 36 fathoms between the Start and the Bill of Portland, and, by not exceeding this depth, you will avoid the strong indraught, before noticed, between Guernsey, Jersey, and the French coast, and their contiguous dangers. The flood of the Bill of Portland runs to the eastward, until a quarter-past 10, at full and change. Care must be taken not to approach the Race and Shambles in less than 26 fathoms, for the water suddenly deepens to 40 fathoms, and more in some holes near the Race, with a rocky bottom, very uneven. In thick weather the lead ought to be kept going, particularly in approaching the Isle of Wight, for many ships have been lost by omitting it. Between the Bill of Portland and Dunnose, 35 to 26 fathoms are proper depths to keep in, with a N.W. or Northerly wind, and by not getting into less than 26 fathoms the indraught towards the Needles, &c., will be avoided. The flood runs to the eastward of Dunnose, in mid-channel, until about eleven hours, full and change, and two hours earlier on the shore it is high water.

Off the south part of the Isle of Wight the ground is rocky and uneven, with strong riplings during spring tides, and therefore a good offing should be kept.

From Dunnose to the Owers the shore may be approached to within 20 or 22 fathoms, and you may stand off to 30 fathoms: if it should be thick weather, and light winds, when near the Owers, the lead ought to be used, because the last quarter flood, and the whole of the ebb, sets strong over the Owers Bank towards St. Helen's Road, and there are 20 fathoms very near it.

* A lighthouse is now erected on Beachy Head, which exhibits a revolving light every night from sunset to sunrise. The light burns at an elevation of about 285 feet above the level of the sea, on a spot named Belle Tote, being the summit of the second cliff to the westward of Beachy Head, and exhibits its greatest brilliancy once in two minutes. Ships sailing from the eastward open the light when bearing N.W. $\frac{1}{4}$ W. westerly; and, whether going up or down the Channel, when to the eastward of Beachy Head, and within 3 leagues of it, by keeping the light open, will pass to the southward of the Southern Head, and all other shoals in its vicinity.

Eastward of the Owers lies the Kingsmore Shoal, extending N.E. and S.W. about 2 miles, having about 6 fathoms, hard gravel, on its S.E. point, which is the least water.

The depths proper to preserve between the Owers and Beachy Head are from 20 to 18 fathoms, and, by not borrowing under 18 fathoms, you will pass outside the Royal Sovereign Shoals, the outermost of which is named the Wide-mouth Shoal, being of a circular form, almost 500 feet in diameter, with 12 or 13 feet on it at low water, spring tides. To avoid it, when round Beachy Head, look out for a spot named Greenland, which keep open with the Bluff Head, and steer E by N., by compass: by this you will fetch Dungeness Lighthouse. Another patch, with 4 fathoms on it, is reported to be E.S.E. $\frac{1}{2}$ S., $6\frac{1}{2}$ miles from Beachy Head, and about 1 mile outside of the former. The Horse of Willingdon lies within them. Off Beachy Head the flood runs to the eastward, until three-quarters past 11. There is much safer anchorage in hard blue clay, and better riding here than at Dungeness; the mark is to bring either of the three windmills on with the sea houses, at Eastbourne. From the shoals off Beachy Head to Dungeness you may stand in to 12 fathoms, and off to 20; and by not coming under 12 fathoms, you will pass clear outside the shoals which lie to the east and west of Dungeness; here the meeting of the tides takes place. From Dungeness a ship should not stand farther off than 17 or 18 fathoms, on account of the Varne, nor less than 12 fathoms towards the shore, until clear of the ledge of rocks that project above a mile from the shore, to the westward of Folkstone. After getting to the eastward of this ledge you may safely approach to within 10 fathoms; and, by keeping within 3 miles of the shore, in passing from Folkstone to Dover, the Varne and Ridge will be avoided. From Dover Road towards the Downs 17 fathoms will carry a ship outside of the South Sand-head, while the track of 15 fathoms will lead directly on it, and 12 or 13 will carry within it; but, in consequence of the South Foreland being steep-to, many ships in the night have run upon the shore, in thick foggy weather, for fear of getting near the Goodwin. However, if the South Foreland Lights are seen, by keeping them in sight, from the deck, over the land, there need be no fear of getting upon the main; but you ought not to come under 10 or 11 fathoms, off the pitch of the Foreland, because you will only be about half a mile from the shore, which is steep, in from 10 to 6 fathoms, and in these depths a ship might ground on the rocks, before another cast of the lead could be got.

If the weather should be so thick as to prevent the lights being seen, it is certainly most advisable to borrow near the main, rather than venture near the Goodwin; but, as the soundings are not a sure guide, great caution must be used, for you will find the depths to decrease towards the South Sand-head, as well as towards the main. The best plan is to keep along the shore, in about 12 fathoms, under easy sail, so as to enable you to get exact soundings; and, when round the pitch of the Foreland, it will be advisable to haul up well to the northward, until a cast of 9 or 8 fathoms is got, so that you may be certain the decrease of depth is towards the main; but, in doing this, you must heave the lead quick, and not borrow under 8 fathoms towards the shore, until you anchor in the Downs.

TO THE SENEGAL AND BACK.*

Outwards.—Whatever may be the season of the year at which vessels sail for the Senegal, it is advisable to get 25 leagues to the westward of Cape Finisterre; from hence it is immaterial whether a course be shaped to the eastward or westward of Madeira. A vessel desirous of touching at the Canaries will adopt the former, and will shape a course for Teneriffe, having nothing to apprehend but the Salvages, the position of which has been frequently well determined. There is no danger, under water, yet known of in the Archipelago of the Canaries; the winds are mostly from N. to N.E., and vessels are seldom becalmed amongst these islands so much as to retard them in their voyage materially. If the course to the westward of Madeira be adopted, a vessel will only make the westernmost of the Canaries, and her place may be rectified by Palma or Ferro.

The information which has been before given in this work, on the coast of Africa, explains every thing which these points possess, of a nature interesting to the navigator; and by means thereof a vessel may steer for any particular point of the coast.

A sight of the coast of Africa, however, is by no means necessary for vessels bound to the Senegal or Goree. What has been said of the currents and prevailing winds in this navigation, leaves no doubt that it is perfectly useless to make the land more than 15 or 20 leagues to the northward of Senegal, when bound to the bar anchorage. This digression is the utmost which should be made from the above course, and by means of the lead, and some few latitudes carefully observed, it might even be made a direct one. On leaving Teneriffe, the true course should be S. by W. $\frac{1}{4}$ W., as far as the parallel of 21° , then South as far as 20° , and from thence steer S.E. by S., without any further alteration.

The first course will carry a vessel more than 25 leagues from the nearest point on the African coast, and in a track where no danger has hitherto been found. The second will conduct her 26 leagues to the westward of the westernmost point of the bank of Arguin. By the third she will make the coast in the neighbourhood of the Marigot of the Musquitoes; from whence she may coast the shore until abreast of the Senegal.

If it be found necessary to make the land during the night, the lead being the only means of correcting the estimated run, should be used more frequently and with greater care. At about 10 leagues from the shore to the northward of the Senegal, a bottom of white sand will be found with 70 fathoms. From thence the depth gradually decreases towards the shore, and at 1 mile from it there are 7 or 8 fathoms. When in 15 fathoms water, it is advisable to anchor until daylight, to avoid running past the bar, which has no mark for indicating it during the night.

If a vessel should make a point on the African coast, to the northward of the bank of Arguin, for instance, Cape Blanco, and starting at 3 leagues therefrom, by steering true S.W. by S., and sounding until on the parallel of 20° , which is a little to the southward of the western point of the bank of Arguin, she will then be about 12 leagues outside of this bank, and in soundings from 80 to 100 fathoms, fine sandy bottom. But I must repeat, that in voyages to the Senegal, a sight of the land to the northward of the Marigot is absolutely useless. In the navigation of the African coast, there is a source of error attached to it, which should be carefully guarded against. It

* Taken from the observations of Baron Roussin. The courses are corrected by the magnetic variation, and consequently reckoned from the true North.

is the optical illusion caused by the great horizontal refraction, which renders any correct estimation of distance almost impossible. Numerous instances of it might be cited, which would hardly be credited, therefore the moment the coast is seen, the lead only should be trusted, to determine the distance from it.

SENEGAL TO GOREE.—The Almadies are 31 leagues S. 40° W., from the roadstead of the Senegal, and the prevailing currents sets nearly on that bearing; it is therefore the course to be steered from the Senegal to Cape Verde during the day. During the night a vessel should steer a quarter of a point more to the westward. From Cape Verde to Goree the course is direct. A vessel is merely required to coast the shore at a distance of 2 miles.

Homewards.—The voyage from the Senegal presents no difficulty, and calls for no other precautions than those commonly used by all navigators in long voyages, on seas void of dangers. These precautions are, not to trifle with the wind, but rather to make a good run in a given time, than to endeavour to make good the proposed course. In all return voyages from places within the Tropics, the grand point is to leave the region of the trade-winds, and get into the variables, and the currents setting to the eastward, as soon as possible. As the winds generally blow from E. to N.W. on the coast of Africa, from the month of December to the end of June, a vessel should keep on the starboard tack until out of their influence. The course made good will be about N.W., and she will then be in the neighbourhood of the Azores. It is immaterial whether she passes to the northward or through the channels of these islands, but it is remarked that the winds are stronger to the westward. It is seldom possible to pass to the eastward of them. The distance no doubt would be shortened, but this passage can only be effected by keeping close to the wind thus far, and experience has proved that there is little to be gained from that. Between June and October, after the squalls from the S.E., the wind occasionally veers round to the West, on the coast near the Senegal; and sometimes it is possible to get within sight of Cape Mirik by means of this wind, and by keeping along shore on the port tack.

TO AND FROM THE WEST INDIES.

Vessels bound to the West Indies, or southern parts of the United States of America, are directed to pursue their course to the westward of Cape Finisterre, agreeable to the instructions already given; having passed Madeira the best course is S.S.W. to gain the trade-winds as quickly as possible, and afterwards proceed to the westward towards your port of destination. Ships bound to Jamaica commonly sail between Montserrat and Guadaloupe and proceed for the high peaked rock, named Alto Vela, 5 leagues from Beata Point, the most southern extremity of St. Domingo; in sailing hence to Jamaica be cautious of running too far north, lest you get on Morant Point (the easternmost point of Jamaica), which is extremely low, but has a lighthouse on it. In thick hazy weather it may possibly be approached so near as to make it difficult to weather, the wind setting right on and the current always going to leeward. Keep therefore, if possible, in about the parallel of $17\frac{1}{4}^{\circ}$ N., and you will run without danger for Yallah's Point, where pilots may be obtained for Port Royal.

Leaving Jamaica in the months of October and March, while north winds prevail in the Gulf of Florida, the general route for vessels bound to Europe

is through the Windward Channel, but at other periods the speediest passage is considered through the Channel of Yucatan, and having the Gulf Stream in your favour, sail through the Strait of Florida. Having cleared the strait, the best track, in summer, is to the northward of the Bermudas, within the influence of the stream, crossing the tail of the Banks of Newfoundland, and so proceed for the English Channel to the northward of the Azores. In winter, when north-westerly gales may be expected from the coasts of America, it is better to pass to the southward of the Bermudas, in about the parallel of 30° N., until you get to the eastward of them, when you may gradually increase your latitude to 35° or 36° , but not higher, until you reach within a few degrees of the Azores.

TO NORTH AMERICA, NOVA SCOTIA, NEWFOUNDLAND, &c.

TO THE UNITED STATES, &c.—Vessels bound to the United States should keep a north-westerly course, until they gain considerably to the westward; by this route the winds will be more favourable than in a more southerly latitude, and ultimately wind and current will prove to your advantage. We would therefore recommend, during the spring of the year, to keep in about the parallel of 46° or 47° , until you reach the meridian of about 37° W.; you may then gradually incline to the southward as far as 43° N., in which parallel you should endeavour to keep, until you reach Cape Sable, passing to the southward of Sable Island at the distance of 60 miles. In the autumn or fall of the year vessels should get as far north as 50° or 55° , and having reached the longitude of 30° W. edge to the southward, and proceed as already directed.

TO THE GULF OF ST. LAWRENCE.—Ships bound to the Gulf of St. Lawrence should endeavour to strike soundings on the Great Bank of Newfoundland, about the latitude of 46° and between the longitudes of 49° and 52° W.; when having passed the meridian of Cape Race and reached the longitude of 53° W., a N.W. by W. course will carry them clear of St. Peter's Island, and directly to the North Cape of the Island of Breton. The North Cape and Cape Ray, the south-west point of Newfoundland, form the two points of entrance to the Gulf of St. Lawrence; they lie about E.N.E. $\frac{1}{4}$ E. and W.S.W. $\frac{1}{4}$ W., distant $18\frac{1}{4}$ leagues from each other. Between them and about 4 leagues E.N.E. $\frac{1}{4}$ E. from Cape North, is the little island of St. Paul, appearing with three hills upon it and deep water all round; but about 11 or 12 miles N.N. Westward from the island is a fishing bank of 25 and 30 fathoms water, while at nearly the same distance from the island, in a N.N.E. direction, are 140 and farther east 186 fathoms. Cape Ray bears from St. Paul's Island E.S.E. $\frac{1}{4}$ E., distant 14 leagues.

After passing the islands of Miquelon and St. Peter's endeavour to steer a middle course between Newfoundland and Breton, passing on either side of St. Paul's Island, but by no means run beyond the parallel of $47^{\circ} 33'$ N., until well passed Cape Ray, for the harbours on the south coast of Newfoundland, to the west of Fortune Bay, are full of dangers, and but imperfectly known; while the whole shore is frequently enveloped in thick fogs, and the rocks cannot then be perceived before your vessel has got irrecoverably entangled among them. In this part also shifts of wind are common, and it will often happen that, after blowing a gale from one point of the compass, it will suddenly vary to the opposite point, and continue equally strong: *thus it has been known that while one vessel has been lying to with a heavy*

gale, another, not more than 30 leagues distant, has been in another gale equally heavy, but with the wind in a direct contrary direction. The winds within the Gulf are not so liable to such sudden changes as on the outside, or to the eastward of Breton Island.

ST. PAUL is not a dangerous island, and may easily be discovered, even in foggy weather, by keeping a good look-out; its shores are high, and although fogs do frequently obscure the land, yet it will, in general, be seen in time to avoid danger. The Magdalen Islands extend in an E.N.E. and W.S.W. direction. There are no harbours, and you must give their N.E. extremity a berth of 2 miles, on account of a reef which runs out from it. In approaching towards them you must avoid the Pearls' Ledge, of only 8 feet water, which lies with the south-eastern extremity of Entry Island, bearing W.S.W. $\frac{1}{4}$ W., distant 5 miles.

The BIRD ISLANDS are small and not far asunder; they are moderately high, flat at the top, and have a white appearance. The southern one is the largest, and from its eastern end a ridge of rocks runs out; in the passage between them there is also a rocky ledge. Bryon, or Cross Island, lies W. by N., distant 4 leagues from the Bird Islands, and N. $\frac{1}{4}$ E., about 10 $\frac{1}{4}$ miles from the N.E. end of the Magdalen Islands, being 5 miles long and very narrow. The depth of water between the Bird Islands and Bryon is from 4 to 14 fathoms; the N.E. end is bold-to, and there is no danger in the channel: but off the S.W. end there is a ledge of rocks even with the water's edge. Between Bryon and Magdalen Islands are 10, 11, and 12 fathoms.

It was formerly considered that beyond the Magdalen Islands all was deep water, but it is now ascertained that there are soundings of 20 to 40 fathoms, sand gravel, and shells. In sailing from the Magdalen and Bird Islands you will gradually get into deeper water, and lose your soundings, when 7 or 8 miles to the north-westward of Cape Rosier.*

Having entered the Gulf of St. Lawrence you will seldom fail to see the Magdalen and Bird Islands, as they must be passed in the route towards the River. It will be better, in thick weather particularly, to go either to the eastward and northward of these, between them and Newfoundland, or to the southward and westward between them and Prince Edward's Island; for, although in fine clear weather, there is a good and safe passage between the Bird and Magdalen Islands, yet when it is dark and foggy the channel will not be so easily distinguished, and perhaps might be mistaken and attended with danger. The weather to the southward of the Magdalens and between them and Prince Edward's Island is generally much clearer than to the northward, therefore the passage that way is to be preferred, particularly after the early part of the year, for then south-westerly winds are most prevalent; and also, if necessary, clear and good anchorage is to be had at the south-eastern part of the Magdalens in Pleasant Bay, very near the shore: this is a safe place for vessels to ride in with westerly winds, and is more to be recommended than to hazard the beating about in the Gulf with a foul wind; the passage into it is safe, and runs in between Amherst and Entry Islands.

Currents.—Vessels navigating the coast of Breton Island, and particularly those which having crossed the Great Bank, and are steering for the Gulf, should be particularly careful to make a proper allowance for a strong current, which commonly sets S. by W. and S.S.W., about 3 miles an hour, and sometimes 4, by which the unwary mariner will be greatly deceived; for

* See the chart of the Gulf of St. Lawrence, published by Mr. Murray.

while he is considering himself in a fairway for the entrance of the Gulf, he will be drifted upon the iron-bound shore, the attendant fogs in summer time concealing his dangers, until it becomes too late for him to avoid destruction. To persons who may unfortunately be driven too near this coast, it may be serviceable to be apprized that a settlement is formed at Ashpee Bay, and good anchorage is to be had behind the island, where boats can land, and water and provisions be obtained; while, for want of the knowledge of such an establishment, many have been obliged to endure both hunger and fatigue unrelieved.

TO ST. JOHN'S, NEWFOUNDLAND.—Vessels bound to St. John's should keep in the parallel of about 46° N., and having reached the outer edge of the Great Bank, and obtained soundings in the meridian of $48\frac{1}{2}^{\circ}$ or 49° W., should steer north-westward for Cape Spear, which lies in latitude $47^{\circ} 30' 53''$ N., longitude $52^{\circ} 33' 27''$ W. Between the cape and St. John's are three bays; the first named Cape Bay, lies between the cape and Black Head; the second, Deadman's Bay, between the head and Small Point; and the third between Small Point and Fort Amherst.

St. John's has a narrow entrance but the harbour is excellent; its situation is readily known by the Block-house, built on Signal Hill, at the north side, and Fort Amherst on its south head, or point of entrance. The channel from point to point is only 360 fathoms wide, but it gets wider just within the points than between them, decreasing again as you approach the Chain Rock, for from the latter to the Pancake Rock the distance is only 95 fathoms; both these rocks are above water and steep-to.

Care must be taken in approaching the harbour in a large vessel, to avoid the Vestal Rock, which lies about 50 fathoms off the southern or Fort Amherst Point; over this rock are 18 feet water; the marks for it are Fort William or the Old Garrison just open of the south head, and the outer Wash-ball Rock open to the eastward of the Cuckold's Head; these latter rocks lie close to the northern point of the harbour, and are always above water, being steep-to, and therefore not dangerous. The course in is N.W. by W., the shores continuing bold until you get near to the Pancake, then give the south side a small berth; continue the same course, or rather more inclined to the westward, keeping Fort Amherst flag-staff open to the northward of Frederick's Battery flag-staff; you will by these means avoid the Prosser, a rock on the port side running off the end of another rock, formed like a saddle, with 18 feet water in the hollow, and only 5 feet on its outside; yet it is steep-to, having not less than 5 fathoms close to it: so soon as you are within, and have passed the Prosser Rocks, you may steer up as you please, both shores being clear of dangers, and anchor in from 4 to 10 fathoms water, on a bottom of mud, and lying quite landlocked.

The winds from the S.W. to the southward, as far as N.E. by E. blow in; all other directions of the wind either baffle or blow out of the Narrows; with the latter winds you must warp in, for the convenience of doing which, rings are fixed in the rocks on each side. The anchorage within the Narrows has from 10 to 16 fathoms, and a little before you enter the Narrows there are 20 fathoms. The tides rise 6, 7, and 8 feet, but very irregular, being much influenced by the winds. The *Variation* is about 2 points W.

TO HALIFAX, NOVA SCOTIA.—Vessels bound to Halifax should pay particular attention to their soundings, especially about the neighbourhood of Sable Island, as the island is low and appears like a small sand hillock. In summer it is frequently enveloped with a fog, but you may discover your proximity to it, by the depth of water; dangerous bars project from its N.E. and N.W. ends, therefore, observe, that, except on these sides, you will have

2 fathoms at the distance of 2 cables' off, your depth increasing at a general rate of about 2 fathoms for every mile until you are more than 20 miles from it.

Making the land of Nova Scotia, about Cape Sable, you must be particularly careful to avoid Seal Island Rocks, and the Brazil Rock. To the westward of Great Seal Island the soundings are very irregular for upwards of 20 miles, at which distance are 45 fathoms, gravel and stones. Indeed the soundings along Nova Scotia, from Cape Canso to Cape Sable, partake of the same irregularity from 25 to 50 fathoms, therefore you should not come nearer to the land than 35 fathoms, unless you are well assured of the exact part you are in, for otherwise endeavouring to enter Halifax you may be driven into Mahone or Mecklenburgh Bays, and be caught by S.E. winds. The weather is generally foggy 4 or 6 leagues off shore, both in spring and summer, but it becomes clearer as you get nearer the coast, and with the wind off the land it will be perfectly clear. Your approach and arrival into soundings may generally be known by the increasing coldness of the water.

As you approach the harbour of Halifax, you will perceive the coast about its environs, particularly to the southward, to be ragged and rocky, with patches of withered wood scattered about; but the land is rather low in general, and not visible 20 miles off; with the exception of Le Have and Aspotogon, which may be seen 9 leagues. The latter have a long level appearance, and when they bear N., distant 6 leagues, an E.N.E. course will carry you to Sambro' Lighthouse, which stands on Sambro' Island.

Halifax Harbour is one of the finest in British America. It is easy of approach and accessible at all seasons, and is said to be large enough to accommodate any number of vessels in perfect security. Its direction is nearly north and south, and its length about 16 miles. Its upper part, known by the name of Bedford Basin, is a beautiful sheet of water, containing about 10 square miles of good anchorage. The Town of Halifax, in lat. $44^{\circ} 39' N.$, and long. $63^{\circ} 37' W.$, is the capital of Nova Scotia, and contains 15,000 inhabitants.

Sambro' Lighthouse exhibits a brilliant fixed light, at 132 feet above the sea, visible 20 to 25 miles. Two 24-pounders are placed on Sambro' Island, under the direction of a small party of artillery-men, which are fired on the approach of vessels, and contribute much to the mariner's safety by warning him off the adjacent breakers.

On the eastern side of the channel lies McNab's, or Cornwallis' Island, which is nearly 3 miles in length and 1 in breadth. There is a small island to the eastward of it, named Carroll's Island; boats can pass this way, or between it and the Devil's Island shore, in what is commonly named the S.E. Passage, but the channel is too narrow for shipping; and it is farther obstructed by a bar of sand to the southward, over which are only 8 feet water. From the western side of McNab's Island proceeds a spit of gravel, named Mauger's Beach, on which is now a lighthouse intended for leading vessels up the harbour. The light is of a red colour, and is elevated 58 feet above the level of the sea. Northward of Mauger's Beach, in McNab's Cove, is good anchorage, in from 9 to 4 fathoms, muddy bottom; the best spot is in 7 fathoms, with Mauger's Beach and Sandwich Point Island locked; George's Tower touching Ives Point.

The promontory, named Chebucto Head, bounds the entrance of the harbour on the west. At $3\frac{1}{4}$ miles above this head, on the western side of the harbour is Herring Cove, where small vessels lie perfectly sheltered in shoal water. The coast between this and Chebucto Head is wholly of rock.

S. by E., at the distance of 2 full miles from Sambro' Lighthouse, is Henery Rock, with 8 feet over it; and to the E.N.E., at the distance of a mile from the Henery, lies the Lockwood, of 12 feet. Both are, of course, exceedingly dangerous to those approaching within a short distance.

The Ledges.—Within and about 2 miles from Sambro' Lighthouse there are several dangers, known under the names of the Eastern and Western Ledges.

Of the Western Ledges, the Bull is the westernmost, and is a rock above water, lying about two-thirds of a mile, S.E. by E., from Pendant Point, with the lighthouse bearing from it E. 7° S. To the south-eastward of the Bull, at the distance of a mile, lies the ledge named the Horses, with the lighthouse bearing E. by N., $1\frac{1}{4}$ mile distant. The S.W. Rock, or Ledge, lies with the lighthouse bearing N.E., $1\frac{1}{4}$ mile.

Great caution is requisite to avoid these dangers, although deep water surrounds them; there being 10 fathoms and a clear passage between the Horses and the Bull, and 20 fathoms between the Horses and the S.W. Rock.

The Owen Rock, so named from its discoverer, Captain Owen, of H.M. steam-vessel *Colombia*, lies with Sambro' Lighthouse, S.W., distant one and three-fifths of a mile. Captain Owen, in his report, says:—"The *Colombia* touched on a sunken rock, or ledge, without entirely losing her way, so that there must have been at least 12 feet water on the part she touched (her draught being $12\frac{1}{4}$ feet); just before the vessel touched there were 11 fathoms, 8 fathoms at the time at the starboard paddle-box, and 18 fathoms at the port paddle-box."

The Eastern Ledges are the Sisters, or Black Rocks, which lie nearly E. by S. from the lighthouse, distant two-thirds of a mile. There is also the Bell, a rock of 18 feet, lying at a quarter of a mile from shore, with the extremity of Chebucto Head N. by E. $\frac{1}{4}$ E. distant three-quarters of a mile.

Within the line of Chebucto Head on the S.W. and Devil's Island on the N.E., are several rocks and ledges. Of these the first is Rock Head, which lies with Chebucto Head S.W. by W., $2\frac{1}{4}$ miles, and Devil's Island N.E. $\frac{1}{4}$ E., about the same distance. The second is the Thrum Cap, a reef which extends from the south end of McNab's or Cornwallis' Island. The next is Lichfield Rock, which lies towards the western side of the harbour, and has only 16 feet over it. At a mile above the Lichfield Rock, on the same side, is the Mars Rock, lying with Point Sandwich bearing North, half a mile, and nearly in a line with it and the west side of George's Island. A reef, named the Horse-shoe, extends from Mauger's Beach on the west side of McNab's Island. It is dangerous, and must be carefully avoided. There is a floating beacon, with a cask at the top, upon Rock Head; it lies with George's Island Tower in one with Ives Point, and Sambro' Lighthouse just seen over Chebucto Head. A beacon of wood, 50 feet high, and painted white, is erected on Devil's Island, on the east side of the entrance. There is a beacon-buoy on Thrum Cap Reef, which lies with George's Island open of Ives Point. When going into the harbour the above three beacons and Mauger's Lighthouse are to be left on the starboard side. On the Lichfield and Mars Rocks there are also flag-beacons, which are to be left on your port hand going in: the leading-mark in, between these beacons, is the flag-staff on Citadel Hill open of Point Sandwich.

Half-way between Mauger's Beach and George's Island, on the opposite side, is a shoal, extending to the south-eastward from Point Pleasant, nearly one-third of the channel over, and having a buoy on its extremity. The thwart-mark for this buoy is a little islet, at the entrance of the N.W. arm, on which is a remarkable stone upon the hill, appearing like a coach-box, and bearing W.S.W.

Between Mauger's Beach and Point Pleasant Shoal there is a middle ground, of $4\frac{1}{2}$ and 5 fathoms, sometimes pointed out by a buoy. This middle ground extends north and south a cable's length, and is about 30 fathoms broad; as you fall off to the eastward of it you will have from 7 to 13 fathoms water, muddy bottom; while on the west side there are from 10 to 14 fathoms, coarse and rocky bottom.

Reid's Rock, having 12 feet over it, lies in-shore, about half-way between Point Pleasant and Halifax. The thwart mark for it is a farm-house in the wood over a black rock on the shore, bearing W. by S. Opposite to Reid's Rock is a buoy on the spit, extending from the north-west end of Mc Nab's Island.

In sailing into Halifax Harbour from the westward, advance to the eastward so as to pass the lighthouse at the distance of a league, taking care not to approach too near to the Henery or Lockwood Rocks before mentioned. When the lighthouse bears N.N.W. $\frac{1}{4}$ W., you will be in a line with the Henery Rock, and with it N.W. $\frac{1}{4}$ W. in a line with the Lockwood. With the lighthouse W.N.W. you will be clear to the northward of both, and may proceed N. by E., 4 miles; which brings you off Chebucto Head. Here you will bring the leading-mark on, which is the flag-staves on Citadel Hill open of Point Sandwich, and bearing N. by W.; and, by keeping them thus open, you will pass clear of the Lichfield and Mars Rocks on the west, as well as of the Rock Head and Thrum Cap on the east. When nearly up to Sandwich Point, which is bold-to, keep Chebucto Head well in sight, without that point; and this direction, kept on, will lead in the fairway up to George's Island, leaving Point Pleasant Shoal on the left, and the Horse-Shoe, or Reef of Mc Nab's Island, on the right. Or, *when abreast of Chebucto Head*, or when Sambro' light bears W.S.W., the light on Mauger's Beach should never be brought to the westward of north. Keeping the light from north to N. by E. will lead clear of the Thrum Cap Shoal, from the buoy on which the lighthouse bears N. $\frac{1}{4}$ W. *Those advancing from the westward* will see the light on Mauger's Beach when they are as far to the westward as Chebucto Head, by keeping it well open on the starboard bow; it will then lead them up to the beach.

George Island may be passed on either side, and you may choose your anchorage at pleasure, in from 13 to 6 fathoms, muddy bottom. From George Island to the head of Bedford Basin there is no obstruction to shipping.

Ships of war usually anchor off the Naval Yard, which may be distinguished at a distance by the masting shears. Merchant-vessels discharge and take in their cargoes at the town-wharves.

Small vessels, from the eastward, occasionally proceed to Halifax by the S.E. passage, within Mc Nab's Island. On the shoalest part of the bar of sand, which obstructs this passage, there are, however, but 8 feet at low water. Above the bar the depth increases to 5 and 10 fathoms, bottom of mud.

In sailing into Halifax Harbour from the eastward, especially with an easterly wind, observe that the Thrum Cap and Rock Head must be carefully avoided. In proceeding this way steer West, W.N.W., or N.W., according to the wind and your distance from the shoals, until George Island, up the harbour, is open a sail's breadth to the westward of Mc Nab's Island; then haul up for Sandwich Point and York Redoubt, until you see the steeple of St. Paul's Church, in Halifax, a ship's length open to the eastward of Judge Brenton's House, a remarkable one, fronting the south. This mark, kept on, will lead clear of Point Pleasant Shoal, and in a fairway between Man-

ger's Beach and Sandwich Point; whence you may steer directly for George's Island, and pass in on the east side, if the wind will permit.

In turning to windward, give the upper or inner part of Manger's Beach a berth of one cable's length, in order to avoid the Horse-Shoe Reef, that runs from the north part of the beach to the distance of $1\frac{1}{4}$ cable's length. You may stand to the Sandwich Point side to within two ship's length, that being bold-to; but stand no farther over to the westward, to avoid Point Pleasant Shoal, then keeping St. Paul's Church open to the eastward of Judge Brenton's House, on the south shore, as above mentioned.

When arrived thus far, put in stays; and, standing to the eastward, keep Little Thrum Cap Island (now Carroll's), a red bluff, open of Mc Nab's Island: having this mark on, put in stays again, and you will thus go clear of the N.W. spit of Mc Nab's Island.*

The little harbour, or cove, named Catch Harbour, to the westward of Chebucto Head, has a bar across the entrance, with 9 feet over it at low water upon which the sea breaks when the wind blows on shore. Within are 3 and $3\frac{1}{4}$ fathoms. • It is frequented by small vessels only.

TO THE BAY OF FUNDY.—If you are off Cape Sable with a westerly wind, and bound to the Bay of Fundy, it is advisable to make for the coast somewhere about the Shuttock Hills, or Petit Manan Lighthouse, as you can with greater safety pass to the westward than to the eastward. Between Grand Manan and the main the passage is free from danger; vessels beating through generally stand from side to side, particularly during the fogs, the depth being from 12 to 70 fathoms, with a bold shore on each side, and the tide through, strong and regular. The Wolves may be passed on either side, having deep water close to them; but they afford no sheltered anchorage, except for small fishing vessels in summer time; they are from 60 to 100 feet high. With light winds, a lee tide, or thick weather, you may let go an anchor anywhere between the Wolves and Beaver Harbour in good holding-ground with a depth of 20 and 25 fathoms.

ST. JOHN'S HARBOUR.—Point Lepreau is bold-to, but dangerous in dark or foggy weather, as it projects so far out to seaward; but from thence to St. John's the course is free from danger. On the point there is a lighthouse showing two fixed lights.

The entrance of St. John's Harbour bears from the entrance of the Gut of Annapolis N. $\frac{1}{4}$ W., 11 leagues, and may be distinguished by the lighthouse on Partridge Island, which shows a fixed light at 120 feet above the level of the sea, visible 20 miles. The tower is painted red and white, in vertical stripes, and is furnished with a bell, to be invariably tolled in thick or foggy weather; its position is lat. $45^{\circ} 14' 3''$ N., and long. $66^{\circ} 3' 5''$ W.

A beacon light is shown within Partridge Island, from a tower erected upon a spit or bar which runs out from Sand Point S.S.E., about half a mile, and which dries at two-thirds ebb. This light is of great utility to the coasters, and all other vessels having pilots on board, as it enables them to enter the harbour at all hours of the night.

* There is great difficulty in making Halifax from the eastward, particularly in the winter season, in consequence of the winds being too frequently from the W.S.W. to N.W., and blowing so hard as to reduce a ship to very low canvas, if not to bare poles; and, should the wind come to the eastward, it is invariably attended with such thick weather as to prevent an observation, or seeing to any great distance; hence, under such circumstances, it would be imprudent to run for the shore, more particularly in winter, when the easterly winds are attended with sleet and snow, which lodge about the masts, sails, rigging, and every part of the ship, becoming a solid body of ice so soon as the wind shifts round to the N.W., which it does suddenly from the eastward. These are circumstances of real difficulty; and it has been recommended, in such a case, to run far to the south-westward, (avoiding the Gulf Stream,) and thence from the S.W. coast, to keep the shore on board, all the way to Halifax.

North-east from the beacon light, just off the town, is a ridge of rocks which is covered at two hours' flood; from this ridge and eastward of the town are extensive flats of sand and mud which dry at low water, and extend along the road to Cranberry Point, stretching off about 2 cables' length.

The bottom, for several miles to the southward of Partridge Island, is muddy, and the depths gradual, from 7 to 20 fathoms, affording excellent anchorage; the passage westward of this island has in it 10 feet; that to the eastward has 16 feet, and abreast of the city are from 7 to 22 fathoms.

A breakwater has been erected on the eastern side of the entrance, below the town, for the purpose of reducing the inset of the sea into the harbour, especially during a southerly gale.

The City of St. John stands on the River St. John near its mouth, and carries on a considerable trade, and many ships are built here. Within the harbour is a valuable fishery, where large quantities of salmon, herrings, and chad are cured for exportation. In the most severe weather it is free from the incumbrance of the ice. The country on the banks of the river abounds in excellent timber, coal, limestone, and other minerals. Partridge Island is about two miles to the southward of the city, answering the double purpose of protecting the harbour, and, by its lighthouse, guiding and directing the mariner to its entrance.

The entrance into the river, 2 miles above the City of St. John, is over the Falls, a narrow channel of 80 yards in breadth, and about 400 long. This channel is straight, and a ridge of rocks so extends across it as to retain the fresh water of the river. The common tides flowing here about 20 feet, at low water the level of the river is about 12 feet higher than that of the sea; and, at high water, the level of the sea is from 5 to 8 feet higher than that of the river; so that, in every tide, there are two falls; one outward and one inward. The only time of passing this place is when the water of the river is level with the water of the sea, which is twice in a tide; and this opportunity of passing continues not above 10 minutes: at all other times it is impassable, or extremely dangerous. After passing the Falls, you enter into a gullet, which is about a quarter of a mile wide, and 2 miles long, winding in several courses, and about 16 fathoms in the channel. Having passed this gullet, you enter a fine large basin $1\frac{1}{2}$ mile wide, and 8 miles long, which enters the main river. The river branches some hundreds of miles up, in a serpentine manner, and runs through a country which abounds with timber, coal, and limestone, and many other minerals; and the surrounding lands are now becoming highly cultivated. There is water enough to navigate vessels of 50 tons as high as Frederickton, and in all the branches of the lakes adjacent, except in dry seasons. At times of great freshes, which generally happen between the beginning of April and the middle of May, from the melting of the snow, the Falls are absolutely impassable to vessels bound up the river, as the tide does not rise to their level.

The following directions for St. John's Harbour and Meogenes Bay are by Mr Backhouse. But it should be mentioned that from Capt. Owen's survey it would appear that the passage on the east side of Partridge Island is the best, there being in the other only 7 to 12 feet, and some shoal spots of less water at low tide.

"When you make Meogenes Island, or Partridge Isle, so as to be distinguished from the lighthouse on the latter, then make a signal for a pilot, and the intelligence from Partridge Island will be immediately communicated to the City of St. John, whence a pilot will join you. Should the wind be contrary, or any other obstruction meet you, to prevent your obtaining the harbour that tide, you may sail in between the south-west end of Meogenes

Island and the main, or between the north-east end and the main, and come to anchor in 4 or 5 fathoms at low water, mud and sandy bottom. The mark for the best anchoring-ground here, is, to bring the three hills in the country to the N.E. in a line with a Rocky Point Island,* and the house on Meogenes Island to bear S.E. by S.

Should the tide of ebb have taken place at the beacon, you must not, by any means, attempt to gain the harbour that tide, but wait the next half-flood, to go over the bar, as both sides of the entrance of this harbour are nothing but sharp rocks, dry at low water; and the tide of ebb is so rapid in the spring, when the ice and snow are dissolved, that all the anchors on board will not hold the ship from driving.

On the Nova Scotia side of the Bay of Fundy, your soundings will be from 50 to 60, 70, 80, to 95 fathoms; stones like beans, and coarse sand; and as you draw to the northward, the quality of the ground will alter to a fine sand, and some small shells with black specks. Approach no nearer to the south shore than in 50 fathoms; and, as you edge off to the N.W. and W.N.W., you will fall off the bank, and have no soundings.

When you have passed Meogenes Island, edge in-shore towards Rocky Point, until Meogenes Point (*Negro Head*) is in a line over the N.W. corner of Meogenes Island; sailing in between Rocky Point and Partridge Island, with these marks in one, will lead you in the best water over the bar, (15 feet,) until you open Point Maspeck to the northward of the low point on Partridge Island; then starboard your helm, and edge towards Thompson's Point, until the red store, at the south end of St. John's, is in a line over the beacon; keep them in one until you pass the beacon at the distance of a ship's breadth; then haul up N.N.W. up the harbour, keeping the block-house, at the upper part of the harbour, open to the westward of the king's store, situated close to the water side, which will lead you, in mid-channel, up to the wharves, where you may lie aground dry, at half-tide, and clean your ship's bottom, or lie afloat in the stream at single anchor, with a hawser fast to the posts of the wharves on the shore.—N.B. The tide of flood here is weak, but the ebb runs very rapidly all the way down past Meogenes Island."

The following directions are based on the details of the survey of Lieutenants Harding and Kortright, acting under the orders of Captain F. W. Owen of the Royal Navy, in 1844.

When running for St. John's avoid the rocky ledge running off Inner Maspeck Point, the eastern side of the entrance, to the distance of $2\frac{1}{4}$ cables' length, and which is steep-to, with 30 to 40 feet close off; and having brought the stone barracks in one with the Wesleyan Chapel,† at the back of the town, bearing N. $\frac{1}{4}$ E., steer in with this mark on, and it will carry you outside of the shoal water extending from the eastern side of Partridge Island. When Carleton Church comes in one with the cliff end (the termination of the cliffs forming Negro Point) bearing about N.W. $\frac{1}{4}$ W., you must change your course to this direction, and it will lead you in from 15 to 22 feet at $1\frac{1}{4}$ cable's length to the northward of the shoal ground extending between Partridge Island and Negro Point. Continue in this direction until the stone church at the back of the town comes on the end of the breakwater, when you must run up with this mark past the beacon-light into the harbour. When just above the beacon-light steer N. by W. or N. by W. $\frac{1}{4}$ W.,

* This is an islet, lying at a cable's length from the point, and more properly named the *Shag Rock*. It is surrounded by sunken rocks.

building will be known by its octagonal tower with a circular top. It is situated in the town.

and anchor off the town. Be careful to keep the lead going when following these directions, that you do not strike on the shoal spots.

To the north-eastward of the beacon-light, and just off the town is a ridge of rocks which is covered at 2 hours flood. From this ridge and eastward of the town there is an extensive flat of mud and sand which dries at low water: this extends along the coast to Cranberry Point, and runs about 2 cables' length from the shore. Cranberry Point is cliffy, and has some rocks running off it.

It is high water on the days of full and change at 11h. 44m.; spring-tides rise 23 to 25 feet, and neaps 21 to 23 feet.

It is said that the following signals are displayed at Partridge Island, on the approach of vessels to the Harbour of St. John:—

One ball close, for one square-rigged vessel.

One ball half-hoisted, for two square-rigged vessels.

Two balls close, for three ditto.

Two balls separated, for four ditto.

A pendant of any colour, for five ditto.

A pendant under a ball, for six ditto.

A pendant over a ball half-hoisted, for seven ditto.

A pendant under two balls close, for eight ditto.

A pendant under two balls separated, for nine ditto.

A flag of any colour, for ten or more ditto.

The above are displayed at the east or west yard-arm, according to the direction in which the vessels are at first observed; and as soon as their rig can be distinguished, descriptive colours will be hoisted at the mast-head, in the following order:—

An union jack, with a white pendant over, for a small armed vessel.

A blue pendant, for a merchant ship.

A red ditto, for a merchant brig.

A white and blue ditto, for a foreign vessel.

A white ditto (without a ball), for a top-sail schooner or sloop.

A red flag pierced with white, for a steam-boat from Saint Andrew's and Eastport.

A ball at the mast-head, vessel is on shore or in distress.

Should immediate aid be necessary, guns to be fired. In foggy weather, a gun will be fired from Partridge Island in return for each heard at sea. Should a vessel require a pilot, her descriptive pendant will be displayed at a yard-arm, in the place of a ball.

In regard to the time for going through the Falls, near St. John's, it may be mentioned that the Falls are level (or still water) at about $3\frac{1}{2}$ hours on the flood, and about $2\frac{1}{2}$ on the ebb, which makes them passable four times in 24 hours, about 10 or 15 minutes each time. No other rule can be given, as much depends on the floods in the River St. John, and the time of high water or full sea, which is often hastened by high winds, and in proportion to the height of them.

To the W.S. Westward of Meogenes Island is Flat Bay, in which the depth is 5 and 4 fathoms water. It is a small harbour occasionally used by coasters. From hence the land runs nearly W.S.W., passing Negro Head, to Cape Musquash, which is 9 miles from Partridge Island. Close off Musquash Head is the Split Rock, with 8 fathoms very near it.

CHANNEL BETWEEN MANAN AND BRYER'S ISLANDS.—Some caution will be necessary in steering between Grand Manan and Bryer's Islands in thick weather, as vessels are frequently drawn in among the islands and ledges to

the southward of Manan, by the flood setting directly upon them; the most dangerous of these is the Old Proprietor, which, at low water, dries for the space of half an acre. When the wind, therefore, veers at all to the southward make the best of your way to St. John's; or you may secure an anchorage in Grand Passage, or St. Mary's Bay, as it seldom blows in that direction above 18 hours without bringing on a fog. There is no difficulty in going through Annapolis Gut if you have but a commanding breeze, although the tide is very rapid, the flood and ebb running five knots an hour, and the eddies strong; about one-third through lies the Man-of-War Rock, about a cable's length from the eastern shore; therefore if you keep in mid-channel you are sure to clear it.

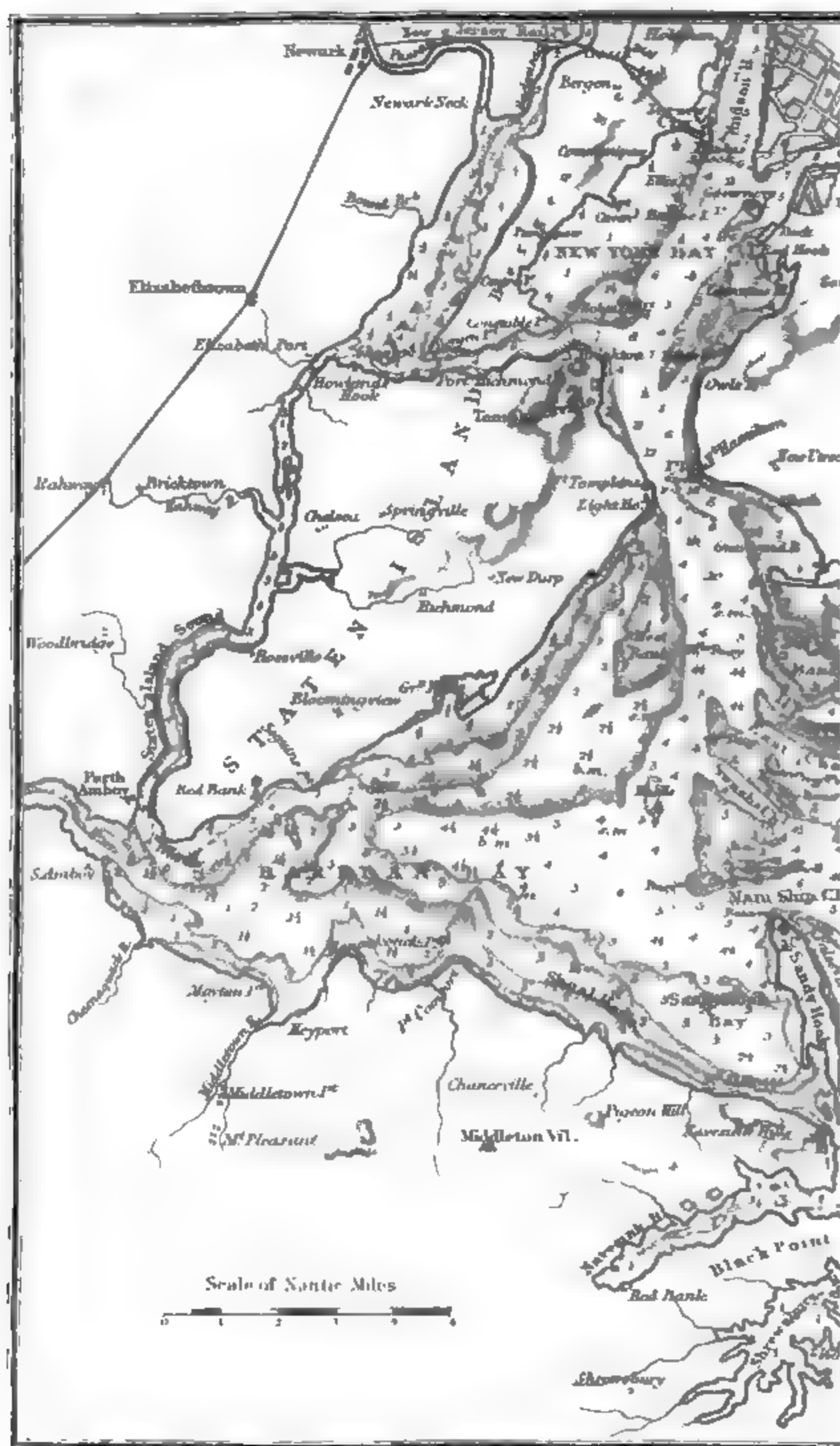
The prevailing winds here, as in general on the coast of Nova Scotia, are from W.S.W. to S.W., nearly as steady as trade-winds, except during the summer months, when they become rather more southerly, accompanied with but little intermission of fog, which requires a N.W. wind to disperse. It is, therefore, recommended not to leave an anchorage without making proper arrangements for reaching another before dark, or the appearance of a fog coming on, which, with a S.W. wind is so sudden that you become enveloped within it unawares; neither should you keep the sea at night, if you can possibly avoid it. Observe, whenever the wind blows directly off the land the fog will soon disperse.

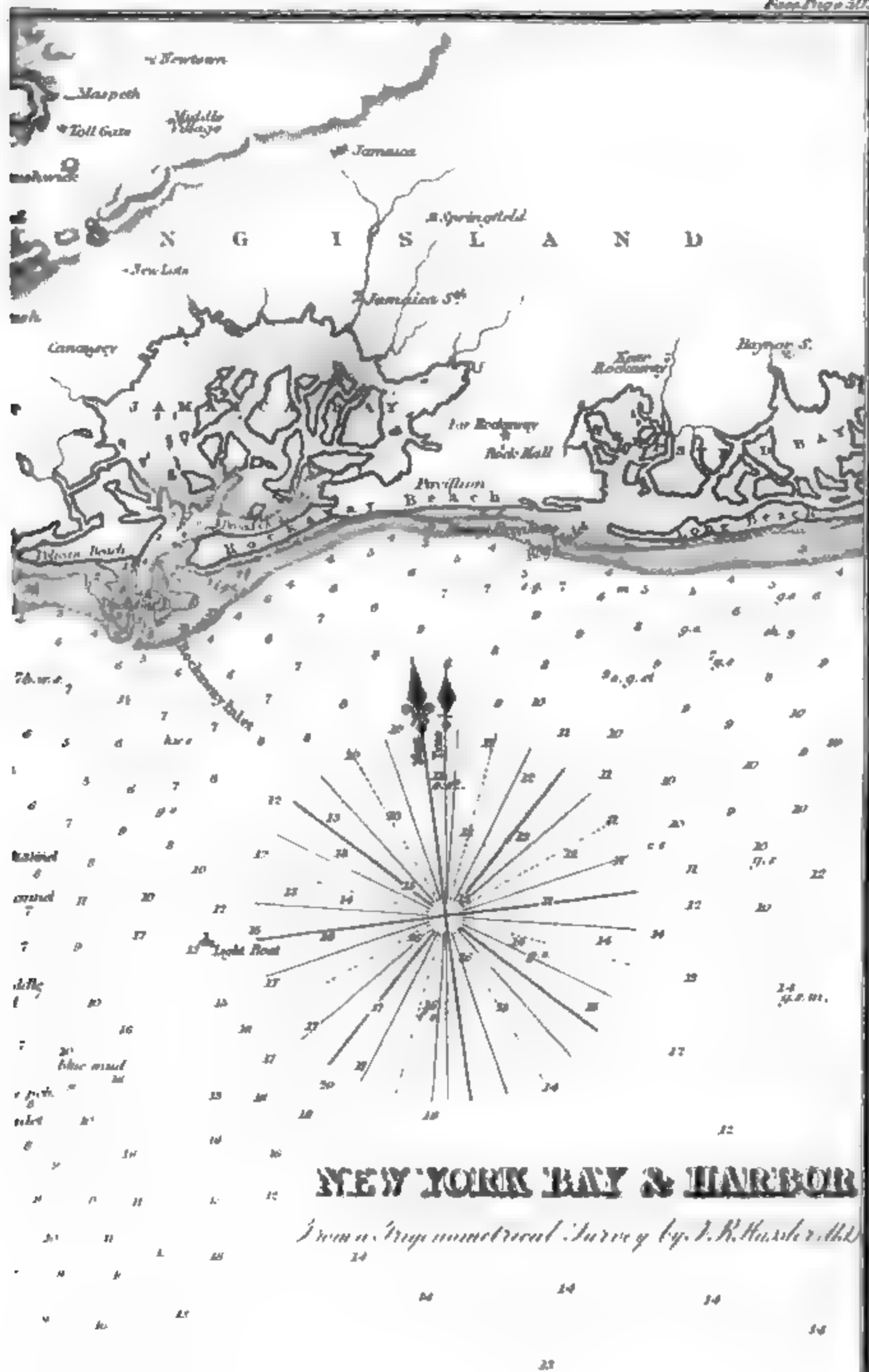
CAPE COD TO BOSTON.—There is a lighthouse erected at the Clay Ponds on Cape Cod, which exhibits a fixed light; it stands on land elevated about 155 feet, which with the addition of the lantern makes it 180 feet above high water mark. There is a lighthouse also on the Race Point, which shows a revolving light, and is therefore readily known from the other. Cape Cod is low sandy land; but Race Point is very bold, and may be known by a number of fish-houses on it. If bound to Boston, and you want to fall in with Cape Cod, bring the light to bear S.W., 2 leagues distant, and then steer W.N.W. for Boston Lighthouse; this stands on a small island, at the north side of the entrance of the channel, and is 82 feet high. In departing from Cape Cod you must calculate the tide, as the flood sets strongly to the S.W. Leaving Boston, your course to Cape Cod is E.S.E., 13 leagues; and when within 2 leagues of the lighthouse, which is 9 miles further, and having brought it to bear S.W., you may steer to the S.E.

TO NEW YORK, &c.—Vessels bound to New York, in passing the shoal ground on St. George's Bank, should pass between them and the Florida or Gulf Stream, and should also pass between it and the Nantucket Shoals. By adopting this plan the passage will be shortened, as you will have the advantage of the eddy currents running contrary to the stream. On the south-west end of Nantucket Island, is a lighthouse standing on Sancoty Head, which is 70 feet high, and shows a revolving light at 150 feet high, visible 20 miles in clear weather. This lighthouse exhibits a flashing white light beyond the distance of 7 miles, the flashes occurring at intervals of one minute, and between the flashes there will appear a fixed white light. Within the distance of 7 miles from the lighthouse there appears a flashing red light, the flashes occurring at intervals of one minute, and between the flashes there will appear a fixed red light.

On Montauk Point, the east end of Long Island, there is a lighthouse 80 feet high, which exhibits a fixed light at 160 feet above the sea visible 20 miles. At about 2½ miles, S. by E., from the light there is a small shoal of 1 and 4 fathoms, named the Montauk Shoal, the situation of which is shown in the tide rip.

YORK.—The City of New York is the largest, most wealthy, and





flourishing in America. It occupies the southern portion of Manhattan, a narrow island, 14 miles long, formed by the Hudson and the East River, and extends 3 miles along the bank of the former, and 4 along the bank of the latter river. Below the city, Long Island, Staten Island, and the main land of New Jersey form a land-locked bay or harbour, of easy access, sheltered from storms, deep enough for the largest ships, and sufficiently large to contain all the navies in the world. No city possesses greater advantages for foreign commerce and inland trade; two long lines of canals have increased its natural advantages, and, connecting it with the remotest west, have rendered it the great mart of a vast region, now occupied by a large population, while its facilities of communication with all parts of the world have made it the great thoroughfare of the continent. In 1650, it contained about 800 inhabitants; in 1700, 6,000; in 1756, 10,381; in 1790, 33,131; in 1800, 50,489; in 1810, 96,373; in 1820, 123,706; in 1830, 202,589; in 1840, 312,710.

In 1786, the whole shipping of the port did not exceed 120 in number, with a tonnage of 18,000. In 1836, it consisted of 2,293 vessels, of which there were 599 ships, 197 barques, 1073 brigs and galleys, 412 schooners, and 4 sloops; with a burden of 350,000 tons. In 1791, the whole amount of the exports was £501,093; in 1816, only twenty-five years later, the mere duties on merchandise imported at New York alone, amounted to £3,200,000; and in 1840, the value of the exports amounted to £6,146,304; and of imports to £15,053,603. The inland and coasting trade is immense; but of its actual extent and value there is no account. Near the northern end of Manhattan is the village of Harlaem, connected with the city by a railroad 6 miles in length; and on Long Island, opposite New York, stands the city of Brooklyn, with a population of 36,233 in 1840; to the north-east of Brooklyn is Williamsburgh, another suburb of the great emporium; and on Wallabout Bay, lying between these, is the United States' navy yard. Several steam-boats at the ferries keep up a constant communication with New York, and a railroad runs eastward through Long Island to Hicksville, a distance of 27 miles. Several of the large Atlantic steamers sail regularly between it and Great Britain.

On approaching the land.—Long Island, from Montauk Point to Sandy Hook, extends W. by S., about 100 miles, and is, at the broadest part, about 17 miles across. The land is generally pretty low and level, excepting a few hills, which lie about 40 miles to the westward of Montauk Point. Along the south side of the island, as already noticed, a flat extends about a mile from the shore, which runs off in some places about a mile and a half. Your course along this flat, from Montauk Point to Sandy Hook is S.W. by W. $\frac{1}{4}$ W., 20 leagues, and then W. by S., $14\frac{1}{2}$ leagues. The east end of the flat is sand: the middle and west parts are sand and stones. At 4 leagues distance from the island, there are from 15 to 18 fathoms water; and from that distance to 20 leagues, the water deepens to 80 fathoms; in the latter depth you will have oazy ground and sand with blue specks in it. About 4 leagues off the east end of the island, you will have coarse sand and shells; and, at the same distance from the middle and west end, there is small white sand. From the S.W. end, there is a shoal which extends, about 6 miles towards Sandy Hook.

In approaching Sandy Hook, the soundings to the southward are full of black specks, between 10 and 20 fathoms; in the true channel, mud; and to the northward, it is red sand.

Should you fall in with Montauk Point, the east end of Long Island, on which the lighthouse stands as before described, observe that, as its latitude

does not differ much from that of the lighthouse on Sandy Hook, you may readily ascertain which it is by the soundings exhibited on the chart. In proceeding thence, westward, for Sandy Hook, you should not approach nearer to Long Island than to the depth of 15 fathoms; and in approaching the Jersey shore, the lead should be constantly hove, as you ought not to stand that way nearer than 10 fathoms, especially in the night or thick weather.

At about $12\frac{1}{2}$ leagues E.N.E., from the high lands of Navesink is an inlet on the south coast of Long Island, named Great South Bay, on the eastern side of which, and at the west end of a narrow island, stands Fire Island Lighthouse, showing a light revolving every minute and a half, which is elevated 89 feet above the level of the sea, and 74 feet from the base. It bears N. $77^{\circ} 35'$ E. from Sandy Hook Lighthouse, distant 12 leagues. From this lighthouse a shoal extends to the southward three-quarters of a mile, and joins the bar, which is very dangerous, as it shoals suddenly from 8 to 6 fathoms, and then directly on the shoal, on which the tide sets very strong. It is not safe to approach the shore nearer than 2 miles, when the light bears to the eastward of North. When the light bears North, in 10 fathoms water, you may steer W. by S., and it will carry you up to the lightvessel at the entrance of New York Harbour. The quality of the bottom is various, viz. :—yellow, red, brown, blue, and grey sand, within short distances.

When coming in from the eastward, and passing the Nantucket Shoals between lat. 38° and $39^{\circ} 30'$, take notice, if possible, when you pass the Gulf Stream; as, at the distance of 10 leagues, within it, you may expect soundings; so soon as you obtain which, you will possibly experience a south-west current.

Should you now be running for the New Jersey Coast, to the northward of Great and Little Egg Harbours, and being near the land, you may suddenly deepen your water to 13 fathoms. In this case put about immediately, as many vessels have been deceived by a hole in this part, of the dimensions of four acres of land, and some have thus been lost.

If beating to windward of the Hook, when waiting for a pilot or wind, either by day or night, when the lighthouse bears nearly West, you will be sufficiently near to Long Island. Here the soundings will be of fine white sand; but towards the Jersey shore they are darker and coarser; and in the fair channel will be found as before described.

Should you fall in so far to the Southward as to approach Cape Hatteras, be very cautious of its shoals, and bear away to the N.N.E., so as to obtain soundings on the Jersey shore. When you have gained 20 fathoms in lat. 40° , haul in to make the land.

It has been remarked that ships from sea, approaching any part of the American coast between Long Island and Cape Hatteras, if in doubt about their reckoning, should take notice of what is commonly named the Gulf Weed, which is in great plenty, and in larger clusters to the eastward of the Gulf Stream than in it, where the sprigs are but small and few. Within the stream there is no weed, unless in rare instances, and there the colour of the water changes to a still darker and muddy colour.

The outer edge of the bank off this part of the coast appears to be very steep; for it has been frequently found that, while the lead has been kept going, there have been found 45 fathoms, soon after 35, and a mile nearer shore only 25 or 20 fathoms; from these depths the shoaling to the shore varies in different directions.

The soundings along the New Jersey coast are the most regular, as the water there shoalens from 35 fathoms on the outer edge, to 12 or 10 fathoms

in sight of land, and thence to 7 fathoms near the shore; excepting only from 2 leagues south of Shrewsbury Inlet to the bar of Sandy Hook, where the water is deeper. Here are 10 fathoms near the shore, and deeper further out, with some patches of rocky bottom. In latitude $39^{\circ} 24'$ the outer edge of sounding lies 19 leagues from shore, and E.S.E from Great Egg Harbour, 18 leagues.

If you fall in to the Northward of the Capes of Virginia, approach the Chincoteague Shoals no nearer than in 15 fathoms: from this steer N. by E., until nearly up with Great Egg Harbour, keeping the lead going. You may advance towards this place, and to the northward, to the depth of 10 fathoms. From Great Egg Harbour to latitude 40° , the shore trends about N.E. by N., and thence to the high lands of Navesink nearly N. by E.

When you arrive off the high lands of Navesink, should you not obtain a pilot, you may venture to proceed, by keeping at the distance of 3 miles from the bare part of the land of Sandy Hook, until you come up with the cedar-trees on the Hook. You will now come in sight of the buoys hereafter described, and may pass between them.

Should you fall in so as to make the Capes of the Delaware, keep about 6 leagues off the land, in order to avoid the bank named the Cape May Bank, which lies more than 5 leagues off between Cape May and Hereford Inlet. (This inlet is frequented by the Delaware pilots, who have no other harbour between it and Egg Harbour.) After passing the bank, which is steep-to, as hereafter shown, you may haul up N.N.E. $\frac{1}{4}$ E., which will lead into 7 fathoms, off Little Egg Harbour. Should you, when abreast of Egg Harbour, be in the depth of 6 or 5 fathoms, you will find white and black sand, intermixed with broken shells; and, by continuing the course N.N.E. $\frac{1}{4}$ E., will deepen to 8 or 10 fathoms, until near Barnigat. Here the soundings will change considerably, especially near Barnigat Shoal, on which is an admixture of mud, shells, and gravel. The shoal does not extend more than 3 miles from the beach, and is steep-to. You may pass along it, in 6 fathoms, within pistol-shot of the outer breaker.

In passing Barnigat Shoal, during the night, keep at least in 9 or 10 fathoms; so soon as you have passed it in this depth, you will certainly have fine white sand, and very hard bottom; having these soundings, you may haul in for the land N. by E. $\frac{1}{4}$ E., on which you will have from 10 to 18 fathoms; but, if the weather permits, you may haul in N. by W., or N.N.W., which will bring you in with the southernmost part of the Woodlands, which is a remarkable part of the coast, there being no other like it between Cape May and the high lands at Navesink.

Barnigat may be readily known in the day, even when the breakers are not seen, as there is a long grove of wood, back in the country, apparently 3 or 4 miles long, directly within Barnigat Inlet, commonly named the Little Swamp. With the north end of this land directly abreast, you will be to the northward of Barnigat.

There is another grove, directly in the rear of Egg Harbour, which is known by the name of the Great Swamp; and that this may not be mistaken for the former, observe that the Great Swamp appears much higher, and is 8 or 10 miles in length. These swamps cannot be seen at one time, as the distance between Egg Harbour and Barnigat is 8 leagues.

Barnigat lies S. by W. $\frac{1}{4}$ W., 45 miles, from Sandy Hook. When hauling in for the Woodlands already mentioned, with the wind off shore, you may keep within a cable's length of the coast, until up with the high lands; and should your vessel not draw more than 10 feet, may continue your course until up with the northernmost part of the cedars on Sandy Hook; after

which steer according to the subsequent instructions. When nearing Sandy Hook there are some shoal spots of 10 and 20 feet, about $2\frac{1}{2}$ miles before reaching the entrance of Shrewsbury Inlet, and along the shore of Sandy Hook there are some banks of 10 to 17 feet, named the Middle Ground, Oil Spot, &c.; these must be cautiously avoided.

THE HARBOUR.—The entrance of New York Harbour lies between Sandy Hook, distinguished by its lighthouse, and the extensive flats which run off from the west end of Long Island. Over these flats there are channels, suitable for various classes of ships, which are in general buoyed; but the main ship channel lies to the southward of them all, and has a depth of water of from 5 to 7 fathoms, except at the entrance, where there is a bar of about 20 feet water. When round the shoals there are from 5 to 7 and 10 fathoms in the channel-way up to New York, and buoys on each side; the deepest part of the channel appears to be between Long and Staten Islands, where there are as much as 13 and 17 fathoms water.

On the southern side of the entrance to New York Harbour are the Highlands of Navesink, the highest part of which, Mount Mitchell, is estimated to be 282 feet above the sea. This high land of Navesink is a very important mark when approaching the coast, as it can be seen when you are 8 leagues off, and in a depth of 30 fathoms water. It appears at first like an island, being pretty level on the summit, excepting some irregular risings towards Point Comfort, on the west end or inland side. As you approach nearer to the harbour, you will see some other high land, situated more at the back of the bay, the first of which may be Hempstead Hill, in Long Island, the summit of which is about 320 feet above the sea level. On Staten Island is Tompkins Hill, at the back of the small village, named Tompkinsville, which is estimated to be 307 feet high. Both these hills will be seen after you have made Navesink.

On the Navesink Hills there are two lighthouses, 40 feet high, at about 100 yards apart, which show the lights at an elevation of about 246 feet above the sea, visible 30 miles. The northern light is a fixed light, and the southern one a revolving. Latitude of the buildings $40^{\circ} 28' 40''$ N., and longitude $73^{\circ} 59' 30''$ W. The bearing and distance between the northern light and the lighthouse on Sandy Hook, are N. by W., $3\frac{1}{2}$ miles.

On Sandy Hook there is a lighthouse, 77 feet high, which shows a fixed light at 90 feet above the sea, visible 20 miles off, and a little to the W.S.W. of this is the telegraph, on a white tower, from which signals are made to New York. There are also two beacons near the lighthouse which are lighted at night.

In the entrance of the bay, and outside the shoals, there is a light-vessel, moored in 15 fathoms, which shows two fixed lights, visible about 12 miles. Its position is with the lighthouse on Sandy Hook, W. by N., $6\frac{1}{2}$ miles, and Navesink Lighthouses, W.S.W., 7 miles. A bell is rung in foggy weather.

Besides these lights there are others inside the bay, which will be described in their proper place.

At about 3 miles to the southward of Navesink Lighthouses, there is a small patch of 10 to 20 feet water, named Sandy Hook Ledge, which lies about three-quarters of a mile from the shore, and has deep water of 4 to 8 fathoms close to outside it. It lies S. by E., 7 miles, from Sandy Hook Lighthouse, and S. by E. $\frac{1}{2}$ E., $3\frac{1}{2}$ miles, from Navesink Lighthouse, and must be cautiously avoided by all vessels coasting Navesink from the southwards. The mark for it is the northern light of Navesink a little open to the eastward of the southern one, which mark will lead directly on the reef.

Along the coast of Sandy Hook, to the southward, there is a series of

small shoals, upon which the depth is from 10 to 15 feet water. Within these shoals there is a narrow channel of $4\frac{1}{2}$ to 3 fathoms, named the False Hook Channel, the direction of which lies round the end of Sandy Hook; this channel is only fit for very small vessels. The first of these shoals is the False Hook, which at present consists principally of a shallow spot of 12 feet water which lies at the distance of $1\frac{1}{2}$ mile. East a little northerly, from Sandy Hook Lighthouse. To the southward of this is the Oil Spot, a small spot of a triangular form, of about three-quarters of a mile in extent, which lies at $1\frac{1}{2}$ mile, E.S.E., from the same lighthouse; on one spot, near the middle, are only 10 feet water, but, in general, 12 to 15 feet may be found upon it. To the southward of the Oil Spot is the Outer Middle Ground, which is a shallow of about 12 to 15 feet, and has an extent of about $1\frac{1}{2}$ mile. Immediately outside these shoals are 4 and 5 fathoms.

False Hook or Along-shore Channel.—This channel lies between the shoals just mentioned and Sandy Hook. It has a N. by W. direction, with a depth of $4\frac{1}{2}$ to 5 fathoms, excepting at the point of the Hook, where there is a narrow ledge of 17 feet, joining the False Hook Shoal. This passage is not recommended unless you are of so light a draught of water as to draw only 10 feet.

If bound into New York from the southward, and close in with the Jersey shore, you may continue on until you get Sandy Hook Light to bear West or W. by N., when you may steer N. by E., to avoid the point of the False Hook, until you get into deep water, say 7 fathoms, Sandy Hook Light bearing S.W., then steer W.N.W. until the light bears S. by E. then with the flood tide steer North, or with an ebb tide N.N.W., (the true course is N. by W.,) which will carry you over the East Bank, and up to the buoy of the Middle.

In going over the East Bank, be careful that you do not get set on the Romer by the ebb tide. The mark to keep clear of this bank is the lighthouse at Sandy Hook open with the east end of the Highlands.

South Channel.—This channel lies to the eastward of Sandy Hook, and outside the False Hook, Oil Spot, and Outer Middle Ground. It is marked by a white can buoy, bearing E. $\frac{1}{4}$ S., $1\frac{1}{2}$ mile, from the Hook Lighthouse, and South a little Westerly, $1\frac{1}{2}$ mile, from the black buoy of the North Channel. This buoy ranges with the west beacon and the block-house, and is in $24\frac{1}{2}$ feet in mid-channel, directly upon a line drawn from the east beacon to the light-vessel. Between the buoys are two shoal spots of 16 feet at low water. The least water in the channel is 21 feet, and its general direction is W.N.W. and E.S.E.

When running for the white buoy give the Jersey shore a berth of three miles. When up with the buoy steer N.W. if with an ebb tide, but N.W. by W. if flood, which will carry you into the Main Ship Channel, when you can proceed as hereafter directed.

The *North Channel* to the northward of the channel just mentioned, is marked on its northern side by a black can buoy, which lies in 24 feet, with the lighthouse on Sandy Hook bearing W. by S., 3 miles, and the same lighthouse in line with Mount Pleasant on the Jersey shore. This is a round hill or rising ground about 13 miles inland from the lighthouse. This channel lies due East and West, and forms the continuation of the Main Ship Channel. The least water in it is 20 feet.

Coming from the eastward, along the shore of Long Island, and having made the Highlands of Navesink, upon which you will perceive the lighthouses already noticed, bring Sandy Hook Lighthouse in one with Mount Pleasant bearing W. by S. This bearing will lead you to the black can buoy, when

having passed it to the southward, a West course will take you into the Main Ship Channel.

Gedney's Channel is to the north of the black can buoy of the North Channel, and is perhaps the best entrance to New York Harbour, as it can be used by vessels of the largest class, drawing as much as 24 feet at low water. The channel runs nearly W. by S. and E. by N., the general depth being from 4 to 5 fathoms. It was discovered by Lieut. T. R. Gedney, of the U. S. Coast Survey.

This channel has lately been buoyed, and many ships now use it when running into the Bay of New York.

Bring Sandy Hook Lighthouse to bear W. by S.; the black buoy of the North Channel will be in one with it, and the granite beacon on the N.W. part of the Dry Romer W.N.W. You must then steer W.N.W. with an ebb tide, or W. by N. with a flood, until you get into 6 fathoms water, when the lighthouse will range with a clump of trees on the Highlands, having its eastern side cut down square. From this position you can steer towards the east beacon on Sandy Hook, keeping it a little open on the port bow, until you get in mid-channel between the Hook and the buoy on the east end of Flynn's Knoll, whence you can steer West towards black buoy on the S.W. Spit, so as to give it a berth of about 200 yards on your starboard hand.

Swash Channel.—The Swash Channel is a gateway lying in a N.W. and S.E. direction from Gedney's Channel. The depth of water in it is from 3 to 4 fathoms, but to a stranger a pilot is perhaps necessary as the navigation is somewhat intricate. The north side of it is formed by an extensive sand which nearly dries at low water. This lies N. by E., about 4 miles, from the lighthouse on Sandy Hook.* The leading mark through the channel is, a white house on the east side of Staten Island on with the gap in the hills on the island bearing N.W. This will lead you up to the black buoy of the Upper Middle, rounding which you must keep the Narrows open, and steer for the light on Robin's Reef; from thence to the city you keep the Battery open with the west side of Governor's Island. When entering the channel you must be particular that you leave the black spar buoy on the east end of Flynn's Knoll on the port side.

East Channel.—This channel lies to the N.E. of the Romer, and has a depth of from 3 to 5 fathoms. It is buoyed throughout, the buoys, 10 in number, being placed on the shoalest parts of the gateway, and in no case whatever should a vessel go beyond the buoys on either side; they are coloured black and white, in horizontal stripes, on the port hand, and on the starboard red and black.

The first buoy on the port hand coming in, is in 25 feet water.

„ second	„	„	„	19	„
„ third	„	„	„	24	„
„ fourth	„	„	„	24	„
„ fifth	„	„	„	24	„

The first buoy on the starboard hand coming in, is in 19 feet water.

„ second	„	„	„	19	„
„ third	„	„	„	24	„
„ fourth	„	„	„	24	„
„ fifth	„	„	„	24	„

The course in, after entering the channel, is W.N.W., by compass, until

* On the N.W. extremity of this shoal is a beacon built of granite 26 feet high, and 9 feet above the water, but it has been remarked that it should have been on the other end of the shoal, as vessels would undoubtedly go ashore were they to run for it. It bears from the lighthouse on Sandy Hook 7° W., and S. 15° E., from the light near Fort Tompkins at the entrance of the Narrows.

Sandy Hook and the Highlands lights are in range. Keep these in range, and run up for the Narrows, which will carry you clear of everything.

There is a true tide setting through the channel, the time of high water the same as at Sandy Hook, viz. :—full and change 7h. 35m.

Lights, &c.—Within the harbour in Raritan Bay, on the west side of Prince's Bay, is a fixed light at 30 feet from the base of the building. It stands on a hill, the top of which is 77 feet above the sea, bearing N. 71° W., distant about 10 miles from the lighthouse on Sandy Hook, and West, about 9 miles, from the white buoy of the Knoll. It is shown from eleven lamps, facing the E.S.E., and elevated 107 feet above the sea.

From Prince's Bay Lighthouse the Point of the Navesink Hills bears S. 40° E.; Sandy Hook Lighthouse, S. 51° E., distant 10 miles; and the spar buoy on the north side of the Round or Middle Shoal, at the entrance of Prince's Bay, S. 86° E.

A fixed light at 40 feet near Fort Tompkins, situated on the eastern extremity of Staten Island, and forming the western side of the entrance to the Narrows. The light is 90 feet above the sea, and forms a good object to vessels approaching the Narrows.

Robin's Reef Light marks the extremity of the flats forming the western boundary of the channel up to the city; on them is 1 and $1\frac{1}{2}$ fathom. This light bears N. by E., $3\frac{1}{2}$ miles from the light at Fort Tompkins.

Prince's Bay.—Should you wish to run for Prince's Bay when you are in Sandy Hook Bay, bring the light on the hill at the western side of the bay to bear W.N.W., and run for it, anchoring as near the shore as you please. S.E. by E. $\frac{1}{2}$ E. from the light will take you on the north point of the Round or Middle Shoal, on which a black spar buoy is placed; this buoy is left on the port hand when going in, but as it is liable to be carried away by the ice, the light should never be brought to the northward of W.N.W.

Buoys, &c.—Throughout the harbour the shoals and channels are marked by can and spar buoys. The principal, and those that are most used, are the can buoys, which remain in their position, excepting in the winter time, when on account of the ice, they are substituted by spar buoys. The spar buoys are coloured black and white, and are arranged in such a manner that on coming in from sea, the black ones are to be left on the starboard, and the white on the port side.

The following spar buoys were laid down by order of the Congress, and are placed intermediately with the can buoys:—

Five black spar buoys between the black can buoy of the bar and the black can buoy of the S.W. Spit.

Four black spar buoys between the black can buoy of the S.W. Spit, and the black can buoy on the Inner Middle Ground.

Three black spar buoys along the edge of the East Bank, between the black can buoy of the Middle and Coney Island. This is a small island separated from Long Island by a narrow creek.

Four black spar buoys on the ledge of the shoal opposite Gowanus Bay in the Narrows, and

One black spar buoy on the east end of Flynn's Knoll on the northern side of the Main Ship Channel, which, by ships entering the Ship Channel, must be left on the starboard hand.

The following are also placed on the west side of the Main Ship Channel:—

Four white spar buoys between the white can buoy of the South Channel and the point of Sandy Hook.

One black spar buoy on the north side of the Round or Middle Shoal, opposite Prince's Bay.

Six white spar buoys on the edge of the West Bank, between the white can buoy of the Knoll, and the can buoy of the West Bank.

Four white spar buoys between the can buoy of the West Bank and Staten Island.

Three white spar buoys between the point of Robin's Reef and Bedloe's Island.

The following are can buoys :—

A black buoy lying in 24 feet, marking the north side of the North Channel, mentioned in p. 507.

A white buoy in 24½ feet, marking the South Channel, mentioned in p. 507.

A black buoy on the S.W. Spit, with Sandy Hook Lighthouse bearing N.W. by W., distant 2½ miles; from the buoy the lighthouse and west beacon appear in one.

A white buoy on the Knoll bearing N.W. ½ N. from Sandy Hook, distant 4 1-10th miles, and Prince's Bay Lighthouse East, about 9 miles.

A black buoy on the Upper Middle, with Sandy Hook Lighthouse bearing S. 15° E., distant 5 miles; from the buoy the lighthouse and east beacon appear in one.

A white buoy on the West Bank, with the lighthouse on Sandy Hook bearing S. 15° E., from the buoy, Snake Hill, in Jersey, appears in one with the hill upon which Prince's Bay Lighthouse is erected.

Directions.—Coming from the southward, and intending to enter by the South Channel, you must give the Jersey shore a berth of three miles, in order to avoid the Outer Middle, and when you are up with the white can buoy, marking the channel, steer N.W. with an ebb tide, but N.W. by W. if flood, which, as already noticed, will carry you into the Main Ship Channel.

To enter by the North Channel, follow the directions given in p. 507.

When you have entered the Main Ship Channel, you may steer in West, towards the point of the Hook, keeping the lighthouse well open on the port bow, taking care, if it is flood, not to be set too far to the northward, and if ebb, to the southward, as outside the harbour the flood sets to the northward, but inside to the westward. In approaching the lighthouse you must not haul too near the shore, on account of the bank at the False Hook: by keeping about a mile from the beach you will avoid it. When abreast of the Hook, so that the lighthouse and east beacon range, keep within half a mile of the shore to avoid Flynn's Knoll, on which are only 7 feet water. This bank lies N. by W., 1½ mile, from the light, and seven-eighths of a mile from the point of the Hook, and has on its east end a black spar buoy. After you have come abreast of the Hook, you must continue your westerly course, running for the buoy on the S.W. Spit, but go nothing to the north of this course, lest you be set on Flynn's Knoll above mentioned. When up with the buoy on the S.W. Spit, give it a berth of full 200 yards on the starboard hand.

But if desirous to anchor, you may, when you have got so far in as the point of the Hook where the beacons stand, haul into Sandy Hook Bay S.W., giving the Hook a berth of a mile, until the lighthouse bears E. by N., or E.N.E., when you may anchor in from 4 to 6 fathoms, muddy bottom.

Proceeding to New York, and having given the above-mentioned berth to the buoy on the S.W. Spit, steer N. by E. ½ E. for the black buoy of the Upper Middle, which is 2½ miles distant from the buoy on the S.W. Spit. Here the light on Sandy Hook and the east beacon will appear in one, but

be careful that you are not set on the West Bank, marked by the can and spar buoys, as with the young flood the tide sets from $2\frac{1}{4}$ to 3 knots to the westward.

When up with the buoy of the Middle you should steer N. by E., until you pass the white buoy on the edge of the West Bank; northward of the buoy is a narrow bank of sand which dries at low water. The mark to keep in mid-channel, clear of this bank, is Robin's Reef Light well open of the eastern point of the Staten Island, on which the light of Fort Tompkins is placed.* When up with the buoy of the West Bank you will open two hummocks in Jersey, of which the westernmost is named Snake Hill; keep this hummock open with the bluff of Staten Island, and steer N. by W., which course will carry you through the Narrows.

Sailing through the Narrows, in order to avoid Fort Lafayette, you must keep Staten Island shore well on board.

The mark to pass the upper part of the West Bank and Fort Lafayette is to keep Bedloe's Island open with the westernmost point of Long Island; for, if you can see Bedloe's Island in coming through the Narrows, there is no danger from the Narrows up to New York. You will steer up for Bedloe's Island to avoid the Mud Flat which you will leave on your starboard hand. This flat is a kind of oyster bed, or bank of mud and shells, and has not more than 11 feet over it at low water; but to avoid this flat do not stand too far to the westward, on account of Robin's Reef, now marked by a lighthouse, upon the west side, to avoid which the mark is to keep the point of land, up the North River, on which Lee Fort stands, open with the east side of Bedloe's Island. Exclusive of the dangers here described, there is nothing to obstruct the navigation to New York, the coast being very steep near the point of Governor's or Nut Island, and the rocks near the battery point do not extend above 100 yards from the shore.

Upon the Mud Flat are four black spar buoys which must be left on the starboard hand, and three white spar buoys are placed on the shoals between Robin's Reef and Bedloe's Island.

Having rounded the S.W. Spit buoy, you will observe, on the Jersey shore, above the Narrows, two hummocks of land, each forming like a saddle. The easternmost of these hummocks kept just open with the bluff of Staten Island, is the leading mark up Channel from the spit clear of the Upper Middle. Having sailed 5 or 6 miles with this mark open, haul more to the eastward until you open the other or western hummock; and, by keeping both open, when sailing up, you will avoid the West Bank, as well as the Middle Ground, and may thus pass up the channel-way through the Narrows. When thus far, you must, as already noticed, to pass Fort Lafayette, keep Staten Island shore on board.

In the directions above, the instructions are given as for slack water, those following them should bear in mind that the flood tide, below the Narrows, sets to the westward and the ebb to the eastward.

OTHER DIRECTIONS.—After making the Highlands of Navesink, which appear to the southward of Sandy Hook, you may run in boldly to within 3 miles of the beach; and run along to the northward, in about 8 fathoms water, until you bring the lighthouse on Sandy Hook to bear W. $\frac{1}{4}$ N., you will then have a round hill, named Mount Pleasant, previously mentioned, in one with the land about a quarter of a mile to the southward of the lighthouse, and will be in a situation for passing the bar; steer in W. by N. until over it, and you will have on it, at low water, $3\frac{1}{4}$ fathoms. When over it you

* Or Snake Hill kept open of the bluff of Staten Island, will also clear the dry sand.

will have $4\frac{1}{2}$ fathoms. Pass the Hook at half a mile distance, as before directed. So soon as the Hook Point, on which the beacon stands, bears S.S.E., you may haul to the southward, and round the Hook, and anchor in 5 fathoms, good ground, with the Hook bearing from E. to N.E.

TO THE RIVER DELAWARE.—In sailing along the coast from New York southwards, and having passed the Highlands of Navesink, it will be noticed that the hilly land is gradually succeeded by a low level coast, which again gives place to a forest and woody flat. This part of the coast may be known by its swampy appearance, appearing like broken islands at a short distance off the shore. In the day-time you may approach to within 2 leagues of the coast, but during the night it is advisable to keep farther off. Along this coast there are no harbours easy of access, or that will admit large vessels. Great and Little Egg Harbours are said to admit, at high water, vessels drawing 12 feet; but they ought only to be run for when no other port can be made, the access being difficult. The soundings along the coast are regular; at the distance of 2 leagues from the shore you will have from 8 to 10 fathoms, until off Great Egg Harbour, and thence to Cape May are from 5 to 7 fathoms.

The soundings opposite to the entrance of the Delaware are very unequal. In the channel near Cape Henlopen, there are from 14 to 16 fathoms; but at 5 leagues East from the cape there are only 8 to 9 fathoms. The greatest danger to a vessel hereabout is the shoal, named the

Five-fathom, or *Cape May Bank*, the shoalest part of which lies about $15\frac{1}{2}$ miles, E. by S., from the lighthouse on Cape May, and $22\frac{1}{2}$ miles, E. by N. $\frac{1}{2}$ N., from the lighthouse on Cape Henlopen, and in lat. $38^{\circ} 53' 30''$ N., and long. $74^{\circ} 38' 30''$ W. This shoalest part is about one mile in extent, and has but 13 to 18 feet water upon it; from thence the bank runs to the N. by W., about $2\frac{1}{2}$ miles, and has soundings over it of 4 and $4\frac{1}{2}$ fathoms, 5 fathoms being on its outer edge. Close to this shoal the soundings are steep-to, and particularly off its southern edge, near the 13-feet spot, where at less than one-eighth of a mile off there are $7\frac{1}{2}$ to 8 fathoms. Between the Five-fathom Bank and the shore the soundings are from $7\frac{1}{2}$ to 5 fathoms, decreasing as you approach the land, on a bottom of fine white, grey, and black sand, with specks; but it is not advisable for strangers to run within the bank.

Off the south end of the Five-fathom Bank there is a lightvessel, showing two fixed lights, which is moored in 8 fathoms at low water, with Cape May Lighthouse bearing W.N.W., distant 14 miles, and the shoal part of the bank N.E. by E. $\frac{1}{2}$ E., distant 3 miles. The lights are visible from 7 to 10 miles off.

When steering for the Delaware, it is recommended not to get into less than 12 fathoms water after you have made the land to the northward of Cape Henlopen, nor to get into a higher latitude than $38^{\circ} 45'$, on account of the Five-fathom Bank. But the lightvessel off the southern end of the bank will afford excellent protection against your running into danger, particularly as it bears a bell, which is sounded in foggy weather.

M'Crie's Shoal.—This is a dangerous shoal lying between the Five-fathom Bank and the entrance of the Delaware, upon which there are but 17 and 18 feet water. It is about a mile in extent, and lies with Cape May Lighthouse bearing N.W. $\frac{1}{2}$ N., distant 7 miles. Close to all round this shoal are $3\frac{1}{2}$ to 6 fathoms, on a bottom of fine grey sand and black specks.

About $1\frac{1}{2}$ mile, W. by N., from M'Crie's Shoal there is a small patch of 18 feet water, the soundings between being $3\frac{1}{2}$ to 4 fathoms water; and a bank of $4\frac{1}{2}$ fathoms has also been found outside the entrance of the river,

from which the lighthouse on Cape Henlopen bore W.N.W., distant 15 miles; close to it, on either side, were 8 to 12 fathoms water.

CAPE MAY.—The lighthouse on this cape stands in lat. $38^{\circ} 55' 48''$ N., and long. $74^{\circ} 57' 57''$ W., and is 74 feet high, and shows a light, at 80 feet, which revolves every three minutes, and is visible 14 miles. At about $1\frac{1}{4}$ mile to the eastward of the lighthouse there is a small village; and in the rear of the building the country is well wooded.

To the southward of the cape the entrance of the river is obstructed for a distance of about 6 miles, by numerous shoals, named the Overfalls, upon which there are generally 12 to 17 feet, and occasionally much less, there being in some places only 3 and 6 feet water. Among these shoals there are some narrow navigable channels, suitable only for the coasters, as they are too intricate to be run for by any but those who are well acquainted. The channel within, immediately round the cape, is named the Cape May Channel, and in it there are from $4\frac{1}{2}$ to 5 fathoms water; but it is narrow and confined by the shoals. The Ship Channel, which is used by the large traders, is the best passage into the river, as it is about 4 miles wide, and has a general depth of 9 to 12 and 15 fathoms, fine yellow and white sand, with black specks and shells. This channel lies to the westward of the shoals, between them and Cape Henlopen, and in running in there is little or no danger if the lead is kept properly going.*

The southern edge of the Overfalls lies N.E. $\frac{1}{4}$ E., $6\frac{1}{2}$ miles, from the lighthouse on Cape Henlopen, and thence they extend to within a mile of Cape May, from the lighthouse on which their southern edge bears S. by W. $\frac{1}{4}$ W., $5\frac{1}{2}$ miles. In many places there are breakers and tide-rips, hence the name "The Overfalls." These shoals are in general steep-to, with 4 to 5 fathoms close off their edges.

CAPE HENLOPEN is on the western side of the entrance to the River Delaware, and has a lighthouse upon it 72 feet high, which shows a fixed light at 160 feet above the level of the sea, visible 18 miles. The position of the lighthouse is lat. $38^{\circ} 46' 36''$ N., and long. $75^{\circ} 5' 25''$ W.

To the northward of the lighthouse, and at the extreme end of the cape, close to the beach, there is a small beacon, which is lighted, and shows a fixed light at 40 feet, visible at about 10 miles. If wishing to anchor in Old Kiln Roads, you must bring the beacon light in one with the lighthouse, approaching the beacon light within a cable's length; then steer W.N.W., until the lighthouse bears S.E., and anchor in 4 fathoms, good holding-ground.

Along the coast of Cape Henlopen to the southward, a shoal, named the Hen and Chicken, extends for a distance of 3 miles from the lighthouse, on some parts of which are but 5 to 12 feet water. In the narrow channel between it and the coast are from 5 to 4 fathoms, and immediately outside of it 9 to 10 fathoms water. In approaching this shoal on the east side, go not nearer to it than 11 or 12 fathoms, and keep the lead going, by which means you will

* The following notice was issued in March, 1823, and should be attended to by all vessels approaching the Delaware from seaward:—

"The risk of coming into this river will be much lessened if the commanders of ships would put a signal for a pilot as soon as they can discover either of the lighthouses; for the Chamber of Commerce and the Insurance Offices have established repeating signals at the lighthouses, upon seeing which, the pilots will always attend and meet the vessels about the lighthouses. But when the signal is not hoisted until you get abreast of the lighthouse, you will be under the necessity of lying to, which will always occasion delay and sometimes danger. The pilot vessels will generally be found cruising about the entrance of the Delaware, but whenever that is not the case, the above caution may be of some importance."

avoid the shoal; or approach the light not nearer than 2 miles ~~on an East~~ bearing. The southern point of this shoal lies S.E. $\frac{1}{2}$ S., $2\frac{1}{2}$ miles, and the northern point N.N.E., three-quarters of a mile, from the light ~~shoal~~.

Immediately round the north end of the cape a breakwater has lately been constructed, to the westward of which there is another pile of masonry, named the Ice Breaker, which has been built for the purpose of protecting the anchorage within the breakwater from the ice, which at certain periods of the year comes down the river in large quantities. On the west end of the principal breakwater is a lighthouse, showing a small fixed light at 56 feet, visible about 12 miles.

To run into the anchorage between the breakwater and the shore, from the southward, pass the Hen and Chicken Shoal at the distance of about 2 miles from the shore, then haul in close to the shore, keeping as close as convenient to Cape Henlopen, as it is steep-to, there being from 9 to 10 fathoms immediately off it; thence you may steer to the anchorage. If from the eastward, bring Cape Henlopen Lighthouse to bear W. by S., and stand in. The harbour may be entered at either end, or between the Breakwater and Ice Breaker, according to the wind and tide, and to the berth selected. Do not anchor in the Gat. The best anchorage is close to the main-work, with the Breakwater Lighthouse bearing N. by W. The holding-ground is good in every part of the harbour, and there is no difficulty in running for it in a gale of wind.

Within the river there are numerous banks, which are in general buoyed; and the course up the river is well lighted, both by floating-lights and lights on the shores. In consequence of the intricacy of the navigation it would be imprudent to attempt the river without a pilot.

RIVER CHESAPEAKE.—From the River Delaware the coast runs to the S.S.W. about 110 miles, to Cape Charles, at the entrance of the Chesapeake, and is in general sandy and marshy. There are various dangerous shoals off the shore, namely, the Fenwick's Island Shoal, Gull Banks, Sinepuxent Shoals, &c., so that it is recommended to keep as far off the land as possible, particularly as it is low, and in consequence difficult to recognise. On the southern end of Assateague Island is a lighthouse bearing a fixed light, and there is also a lighthouse on Smith's Island, near Cape Charles, which shows a revolving light.

In sailing along the coast of Delaware and Maryland in the vicinity of Rehoboth Bay and Sinepuxent Sound you will have 5 to 8 fathoms, at the distance of about 3 miles from the coast, and a strong current setting to the southward; but it is recommended to keep at a much greater distance off on account of the shoals previously mentioned, which lie more or less at a distance of 7 to 8 miles from the land. The harbour of Chincoteague is in about latitude $37^{\circ} 55' N.$, and is occasionally run for by small coasting vessels, in cases of great emergency; but it is said to require considerable care when going in. There is also Matomkin Harbour, also used by coasters. When you are to the southward of Chincoteague, steer to the S.S.W. for the lighthouse on Cape Henry, keeping the lead going, because that the northern part of the Machapungo Shoals, lies 4 or 5 leagues to the northward of Smith's Island, and the southern part of them comes nearly abreast of the said island. As you approach Smith's Island you will have 13 fathoms, and in some places but 3 or 4 fathoms, on a bottom shoaling gradually to the shore. In lat. $37^{\circ} 30'$, and in long. 75° , you will have from 26 to 27 fathoms, which will be about 35 miles from the land. Along this coast is a strong current running to the S.S.W., in the direction of the shore, at the rate of from 2 to $2\frac{1}{2}$ knots an hour.

From the Capes of Virginia, or the Chesapeake, the shore is generally steep, as far as the Wimble Shoals, to the southward, which lie in lat. $35^{\circ} 32'$, at about 7 miles off shore. The greatest extent of soundings from shore is to the eastward of Cape Henry; it being, in that part, between 23 and 24 leagues, with various depths. At the distance of about 7 leagues, and in the latitude of the cape, there is a bank of $9\frac{1}{2}$ fathoms, between which and the cape there are 11 and 12 fathoms, and there is the same depth to some distance without it. The bank is of small extent, and there are 14 and 16 fathoms north and south of it. To the eastward the water deepens gradually to 25 fathoms; it then suddenly shoals to 20, and, again, in like manner, suddenly deepens to the edge of soundings. The ground off Cape Henry is in general coarse sand, with some gravel; but thence to Cape Hatteras it is commonly fine sand, with oaze.

Ships falling in with the land to the northward of the entrance, should not stand inwards to a less depth than 7 fathoms, until they come into the latitude of Smith's Island and Cape Charles, whence they may stand with safety into 5 fathoms. In coming along shore from the southward, 7 fathoms will be a proper depth to keep in, until up with Cape Henry; whence falling into 8 or 9 fathoms, with sticky bottom, you will be in the channel-way.

When you come in towards the land, to the southward of Cape Henry, you will have deeper water than when you are in the latitude thereof, as 21 fathoms, reddish sand, and pretty large: 9 leagues off it there are 35 and 40 fathoms, fine grey sand.

The land is low and sandy; you cannot see it above 7 leagues off. Cape Henry is low, but bluff, with a few trees to the sea side, at a little distance from the water; it is moderately steep-to, excepting that a small shoal stretches about 2 cables' length from the shore east of the lighthouse, and there is nothing to hinder a ship from passing into Lynhaven Bay, where there is soft ground, and from 4 to 6 fathoms water. The bank, named the Middle Ground, is about 4 miles from the cape.

When coming in from sea, in the latitude of Cape Henry, you will meet with soundings as above described. You may readily ascertain when in soundings by the muddy colour of the water. In clear weather the land of Cape Henry may be seen from the depth of 10 or 11 fathoms, regular soundings, which lie 5 or 6 leagues to the southward of the cape; more to the northward, the soundings are irregular and coarser, as above described.

The Middle Ground off Cape Henry now extends more to the southward than formerly; and it is said that there are $4\frac{1}{2}$ fathoms, with the lighthouse bearing W. by S., 5 miles. This bearing, therefore, now leads over the tail of the bank; and the safest course in is with the lighthouse W.N.W., or W. by N.

Chesapeake Bay is 160 miles in extent from North to South, and is considered to be one of the finest estuaries in the globe. It is the recipient of many rivers which fall into it on all sides, as the Susquehanna, Patapsco, Patuxent, Potomac, &c.

In advancing towards the entrance of the Chesapeake, the Gulf Stream is usually crossed from the south-eastward, in its narrowest part, near the parallel of Cape Hatteras, or $35^{\circ} 10'$ N. In crossing it thus, the temperature of the water will be found, in September, to be about 83° , thence diminishing to the shore. Even in December, when in soundings of 19 fathoms in latitude $35^{\circ} 10'$, with the air at 45° , the water has been found at 68° , after getting into soundings. Within the stream, after reaching soundings, you will get into the cold southerly current, the prolongation of the currents passing over the Newfoundland Banks.

The lighthouse on Cape Henry, in latitude $36^{\circ} 56'$, is an excellent mark for the Chesapeake; it shows a fixed light at 120 feet above the sea, visible 24 miles. Having passed the cape, in sailing upward, in the main stream, low banks, fringed with trees, are all that is to be seen of the country, excepting here and there a house near the shore, and occasionally a lighthouse, small town, or village.

It should be observed, generally, that in the Chesapeake, all the low points, both of Virginia and Maryland, have shoals extending from them; and should, therefore, have a good berth in passing, the water being shoal.

To run up the Chesapeake a pilot is always taken by strangers.

CHARLESTON HARBOUR.—Between the Chesapeake and Charleston there are no harbours of any importance, which are visited by large foreign vessels. In coasting along it will be necessary to give a wide berth to Capes Hatteras, Lookout, and Fear, as from them shoals run out to seaward, from 10 to 15 miles, and are the more dangerous, as their outer edges are steep-to. The coast about Cape Roman has also sandy flats off it, extending out 6 or 7 miles from the land, which must not be approached nearer than 7 fathoms. The shore is very low throughout the whole of this extent of coast, and affords but few objects easily recognized at sea.

The lighthouse at the entrance of Charleston Harbour bears S.W. $\frac{1}{4}$ W., 81 miles, from that of Cape Roman; between are several low islands, the principal of which are named Bull's, Cooper's, Davies', Long, and Sullivan's Islands. Flats extend from all the islands, along which the soundings are regular. Bull's Island appears very bluff, with red sand-hills, and a spit from the outer end of it extends eastward, about $3\frac{1}{2}$ miles; a spit named the Rattlesnake, also extends to the distance of 3 miles, E. by S., from Sullivan's Island, which forms the north side of the entrance to Charleston, and you will be on the edge of it in $5\frac{1}{2}$ fathoms. With Charleston Churches to the northward of Sullivan's Island, you will be on the edge of the Rattlesnake; and when the churches are open to the southward of Sullivan's Island, you are clear of that shoal. You should approach no nearer to this bank than in 5 fathoms water.

The entrance to Charleston Harbour is distinguished by a lighthouse erected on a low sandy point upon Morris's or Lighthouse Island; the lantern is 125 feet above the sea, and exhibits a revolving light, which may be seen 8 or 9 leagues off. When drawing nigh it, the time of darkness will be twice that of illumination, and, as you approach, the period of darkness will decrease, and that of light increase, until you get within the distance of 3 leagues, when the light will never wholly disappear; but the greatest strength of the light, in comparison with the least, will be as 24 to 1. St. Michael's Church, at Charleston, is also an excellent mark, it having been painted pure white: it may be seen in clear weather nearly 7 leagues. There is also a small beacon on the same island, which is lighted.

Off Charleston Bar there is good anchorage in 6 fathoms, with the lighthouse W. by N., 6 miles, and Sullivan's Island N.W. $\frac{1}{4}$ W., 7 miles.

Channels and their Buoys.—There are two white beacons on Morris's Island, which, when kept in range, will bring you to a buoy lying at the entrance of the Overall Channel; and by keeping the beacons directly on with each other, and steering for them until you strike 5 fathoms water, you may then direct your course to Sullivan's Island.

There are three buoys in the North Channel, which serve to direct you by running for the outer buoy, and leaving it on the port hand, thereafter for the middle buoy which you leave on your starboard hand, and then for the inner buoy which you leave on the port hand. The same water may,

nearly be found in this as in the Overall Channel, but the latter is to be preferred.

There is one buoy at the entrance of the Lawford Channel, which may be found by keeping the South Beacon (which is not lighted) open to the northward of the lighthouse about three handspikes' length. Leave the buoy on the starboard hand at the distance of 50 yards, and steer N.N.E. to clear shoals on the port hand, until the lighthouse bears W.N.W., when you should direct your course to Sullivan's Island.

The Ship Channel and Bar lie between the north and south breakers, which will be seen as you approach. When standing in for the bar, you should bring the beacon on Lighthouse Island to appear a handspike's length to the north of the lighthouse, and you will soon make the Bar Buoy, lying in 3 fathoms water, and which may be passed on either side. Nearly in the same range lie two other buoys; the first on the south point of the north breaker, and the other on the inner south point (or S.W. point) of the same breaker. These buoys are to be left on the starboard hand, at the distance of a ship's length. After passing the inner buoy, steer North or N. $\frac{1}{4}$ W. (according as the tide is flood or ebb) for Sullivan's Island, keeping the two beacons on it in range until you are up with the buoy off Cummin's Point, which you leave on your port hand. The course from the buoy off Cummin's Point is N.W. by N. to the anchorage in Rebellion Roads. You will clear the Middle Ground, when mid-way between Sullivan's Island and the buoy off Cummin's Point, by steering for Fort Pinckney, keeping it a little on the port bow. As you approach the island you must give it a berth of 100 yards, and anchor off the city.

TIDES.—It is high water on the American coast at the various undermentioned places, as follows:—

On the south side of the Gulf of St. Lawrence, 9 $\frac{1}{2}$ hours. The tide rushes with much rapidity through the Gut of Canso, in the narrowest part of which it seldom runs at a slower rate than 4 or 5 miles an hour. On the south shore of Northumberland Strait the time of flowing on the full and change is from 7 to 8 hours; the perpendicular rise is from 3 to 7 or 8 feet. The tides here are very materially varied by the winds; it has been found that at times the stream of the Gut of Canso has continued to run one way for many successive days. It is high water at St. John's, Newfoundland, at 7h. 50m; the tides rise 6 to 8 feet, but very irregular, being much influenced by the winds. At Halifax dockyard it is high water on the full and change at 8 o'clock; springs rise from 6 to 9 feet. At St. John's, New Brunswick, at 11h. 44m.; springs rise 24 feet. At Cumberland Basin at 12h.; springs rise 60 feet. At the eastern side of Manan Island at 10h; springs rise 25, neaps 20 feet. In Passamaquoddy Bay at 10 $\frac{1}{2}$ h; springs 30, neaps 24 feet. At Annapolis Gut at 10h.; springs rise 18 feet.

The tides at the entrance, and within the Bay of Fundy, are very rapid but regular, and although the wind against them alters the direction of the ripplings, and sometimes makes them dangerous, yet it has little or no effect upon their courses. The flood tide sets from Cape Sable to the north-westward through the Seal, Mud, and Tusket Bald Islands, at the rate of 2 or 3 miles an hour, and in the channels among the islands it increases to 4 and 5 miles. From thence, taking the direction of the main land, it flows past Cape St. Mary, and then N.N.W. towards Bryer's Island; it runs up St. Mary's Bay but slowly, which adds to its strength along the eastern shore, then increasing its rapidity as the bay contracts, it rushes in a bore into the Basin of Mines and up Chignecto Bay, so that here the water sometimes rises to the extraordinary height of 75 feet.

It is high water off Boston Lighthouse at 10h.; it flows off the town till a quarter of an hour past 11; the springs rise 16 feet perpendicularly, neaps 12 feet. It is high water off Race Point, at 11h. 45m.; on leaving Cape Cod for Boston you must calculate the tide, as the flood sets strongly to the S.W. At Sandy Hook, at 7h. 29m., but the stream of tide continues to set in, at the rate of 2 knots, until 9h. At New York, East River, it is high water at 9h.; in the North, or Hudson's River, at 11 o'clock: the vertical rise of tide is about 7 feet, but it is sometimes checked by the westerly or north-westerly winds, so as to lower the water on the bar to $3\frac{1}{2}$ fathoms: easterly or north-easterly winds have frequently raised it to 5 fathoms. The flood sets strongly to the westward from the S.W. Spit, until above the Upper Middle, whence it runs up in the channel course to the Narrows.

In the Delaware it is high water, on the full and change of the moon, as follows:—Cape May, at $8\frac{1}{4}$ h.; Cape James, or Henlopen, at 9h.; Bombay Hook, $10\frac{1}{4}$ h.; Reedy Island, $11\frac{1}{4}$ h.; Newcastle, 12h.; Philadelphia, 3 o'clock. First quarter flood sets near the capes W.N.W.; second to last quarter N.N.W.; first quarter ebb E.S.E.; second to last quarter ebb S.S.E. With spring tides the vertical rise is from 6 to 7 feet; neap tides $4\frac{1}{4}$ to $5\frac{1}{4}$, but varied by the winds. The flood tide runs in round Cape Henry, and into Lynhaven Bay, until 11 o'clock, on the full and change, and out of the way of the Chesapeake stream it flows at 10h.; in Hampton Road, at $10\frac{1}{4}$ h. The tide varies considerably in its direction, according to the time from ebb or flood. The ebb from James and York Rivers sets over the Middle Ground to the eastward, which renders the navigation thereabout dangerous in the night.

It is high water at Charleston at 7h. 15m. The depth of water on the bar at low water, neap tides, is 12 feet, at high water, neap tides, 17 feet; at low water, spring tides, 11 feet, high water, $18\frac{1}{4}$ feet. From thence towards Savannah, it has been observed that N.E., E., and S.E. winds cause higher tides than other winds. At Port Royal the tide flows, in the full and change of the moon, at $8\frac{1}{4}$ h. About 6 leagues from the land, in 12 fathoms water, the flood sets strongly to the southward, and the ebb to the northward; at a great distance from the shore there is no ebb at all. On Savannah Bar there are 20 feet, at low water. At St. Mary's River it is high water at $8\frac{1}{4}$ h.; the tide rises 6 feet at common, and 7 feet at spring tides.

VARIATION.—The variation at St. John's, Newfoundland, is 28° W.; Cape Ray, 24° ; Quebec, 15° ; St. Paul's Island, Gulf of St. Lawrence, 21° ; Gut of Canso, 16° ; Halifax Lighthouse $13^{\circ} 35'$; Cape Sable, $11^{\circ} 15'$; Boston Bay, $7^{\circ} 40'$; in New York Harbour, about 7° ; off the Delaware, 4° , and about the same off the Chesapeake.

SECTION VIII. ●

GENERAL DESCRIPTION OF WINDS, TIDES, CURRENTS, &c.

A change in the temperature of a portion of air, an increase or a diminution of the quantity of water, which it holds in a state of vapour; in short, any circumstance which causes it either to contract or to expand, destroys

the equilibrium subsisting among the different parts of the atmosphere, and occasions a rush of air, that is, a wind, towards the spot where the balance has been destroyed.

WINDS may be divided into three classes—those which flow constantly in the same direction, those which are periodical, and those which are variable. It must be observed that the terms which express the direction of winds are employed in a sense quite contrary to that in which they are used when we speak of the direction of currents in the ocean; a westerly current, for example, signifies a current flowing towards the west, but a westerly wind signifies a wind coming from that quarter.

The permanent winds are those which blow constantly between, and a few degrees beyond the tropics, and are named trade-winds. On the north of the equator their direction is from the north-east (varying at times a point or two of the compass each way); on the south of the equator they proceed from the south-east. The origin of them is supposed to be this:—the powerful heat of the torrid zone rarefies or makes lighter the air of that region; the air, in consequence of this rarefaction, rises, and, to supply its place, a colder atmosphere from each of the temperate zones moves towards the equator. But (as in the case of the polar currents in the ocean) these north and south winds pass from regions where the rotatory motion of the earth's surface is less to those where it is greater. Unable at once to acquire this new velocity they are left behind, and instead of being north and south winds, as they would if the earth's surface did not turn round, they become north-east and south-east winds. The space included between the second and fifth degree of north latitude is the internal boundary of the two winds; and this space experiences calms, frequently interrupted, however, by violent storms. The reason why it is situated to the north of, instead of exactly at, the equator, seems to be that the northern hemisphere is warmer than the southern; for since the trade-winds are the result of the continual ascent of heated air in the equatorial parts, their internal boundary will be where the principal ascent is going on—that is, where the annual temperature is the highest, which, on account of the above-mentioned inequality of temperature in the two hemispheres, will not be at the equator, but somewhat to the north of it. The external limits of the trade-winds are at a medium in about the 30° of north and south latitude respectively; but each limit, as the sun approaches the neighbouring tropic, declines further from the equator. The position of the sun has an influence also on their strength and direction; for when that luminary is near the Tropic of Cancer, the south-east wind becomes gradually more southerly and stronger, and the north-east weaker and more easterly; the effect is reversed when he gets towards the Tropic of Capricorn.

The **TRADE-WINDS** would blow regularly round the whole globe within the distance of about 30° or 40° from the equator each way, if the space within those limits were all covered with water; but the uneven surface and unequal temperature of the land divert and derange them; it is on this account that the trade-winds are constantly experienced only over the open ocean. The larger expanse of ocean over which they range, the more steadily they blow; thus in the Pacific they are commonly more steady than in the Atlantic Ocean, and in the South than in the North Atlantic. In sailing from the Canaries to Cumana, on the north coast of South America, it is hardly ever requisite to touch the sails of the vessel. The voyage across the Pacific, from Acapulco on the west coast of Mexico to the Phillippine Islands, is performed with equal facility; and if there were a channel through the Isthmus of Panama, a westward passage from Europe to China would be more speedy and safe than the usual navigation thither round the Cape of Good

Hope; the only interruption to the evenness of this voyage would be in the Carribean Sea and the Gulf of Mexico, where the trade-wind blows impetuously, and is sometimes interrupted by westerly winds. It would not be possible, however, to return by the same route, because in sailing east way must be made to the northward, in order to get beyond the region of the trade into that of the variable winds. Both in the Atlantic and in the Pacific Ocean the current of the trade-winds becomes broader and more directly east in its course, as it advances from one side to the other of those extensive basins. On the west coast of Africa, owing to the rarefaction which the air undergoes over that continent, the wind is mostly turned towards the shore; from Cape Bojador to Cape Verde it is generally N.W., and thence to the Island of St. Thomas, under the equator, it bends gradually first to the West and then to the S.W.; along the coasts of Chili and Peru a South wind prevails: these are two instances of the interruption which the trade-winds experience in the neighbourhood of large masses of land.

In the Indian Ocean the south-east trade-winds prevail between 28° and 10° of south latitude, from within a few degrees of the east side of Madagascar, nearly to the coast of Australia; but from 10° south latitude to the northern shores of that ocean the uniformity of the tropical movement of the atmosphere is destroyed by the monsoons, which belong to the class of periodical winds. These blow half the year from one quarter, and the other half from the opposite; winds and violent storms prevail for a time which render it dangerous to put to sea. They of course suffer partial changes in particular places, owing to the form and position of the lands, and to other circumstances, but it will be sufficient to give their general limits and directions. Northward from the third degree of south latitude, a south-west wind blows from April to October—from October to April a north-east: these monsoons extend over the China sea, but here they incline more to the direction of north and south. Between 3° and 10° south latitude, a north-west wind blows from October to April, and a south-east during the other six months of the year; the former is seldom steady in the open sea, but in December and January it sometimes extends northwards a degree or two beyond the equator. These two monsoons have the greatest strength and regularity in the Java Sea, and thence eastward towards New Guinea. The facts above exhibited may be thus summed up: from April to October a south-west wind prevails north of the equator, southward of this a south-east wind from October to April, a north-east wind north of the equator, and a north-west between the equator and 10° south; south of this the usual trade-wind, which is in motion through the whole year.

In attempting to account for these movements of the atmosphere over the Indian Ocean, the first thing which strikes us is, that the north-east and south-east monsoons, which are found the one on the north and the other on the south side of the equator, are nothing more than the trade-winds blowing for six months, and then succeeded for the remainder of the year by winds directly opposite. It is also to be noticed that the south west monsoon in the northern, and the north-west monsoon in the southern, hemisphere, each prevails while the sun is perpendicular to their respective regions; they are, therefore, connected with the immediate presence of that luminary. If the Indian Ocean were not bounded as it is by land on the north, the trade-winds would blow over it (at least in the central parts) as they do in the Atlantic and Pacific Oceans; but it is well known that water, owing to its transparency, is very little warmed by the sun's rays, whereas the land is powerfully heated by them; consequently, when the sun is between the equator and the Tropic of Cancer, India, Siam, and the adjacent countries,

become much hotter than the ocean ; the air over them gets rarefied and ascends, colder air then rushes in from the Indian Ocean, and a south-west wind is produced. When the sun, however, has crossed to the south of the equator, these countries become gradually cool, and the north-east trade-wind resume their course. At the same time the north-west monsoon commences in the southern hemisphere, in consequence of the air over New Holland being rarefied by the presence of the sun.

The monsoons in the Red Sea blow in the direction of the shores ; and a similar effect is observed in the Mozambique Channel, between Africa and Madagascar, where these winds follow the line of the channel. On the coast of Brazil, between Cape St. Augustine and the island of St. Catherine, and in the bay of Panama, on the west of the isthmus of that name, periodical winds occur somewhat similar to the monsoons of Asia.

The land and sea-breezes, which are common on the coasts and islands situated between the tropics, are another kind of periodical winds. During the day the air, over the land, is strongly heated by the sun, and a cool breeze sets in from the sea ; but, in the night, the atmosphere over the land gets cooled, while the sea, and consequently the air over it, retains a temperature nearly even at all times : accordingly, after sunset, a land-breeze blows off the shore. The sea-breeze generally sets in about ten in the forenoon, and lasts till six in the evening ; at seven the land-breeze begins, and continues till eight in the morning, when it dies away. These alternate breezes are, perhaps, felt more powerfully on the coast of Malabar than anywhere—their effect there extends to a distance of 20 leagues from the land. During summer, the sea-breeze is very perceptible on the coasts of the Mediterranean, and sometimes even as far north as Norway.

We thus perceive that within the limits of from 28° to 30° , on each side of the equator, the movements of the atmosphere are carried on with great regularity ; but, beyond these limits, the winds are extremely variable and uncertain, and the observations made have not yet led to any satisfactory theory by which to explain them. It appears, however, that beyond the region of the trade-winds, the most frequent movements of the atmosphere are from the south-west in the north temperate zone, and from the north-west in the south temperate zone. This remark must be limited to winds blowing over the ocean, and in maritime countries ; because those in the interior of continents are influenced by a variety of circumstances, among which the height and position of chains of mountains are not the least important. These south-west and north-west winds of the temperate zones are most likely occasioned in the following manner :—In the torrid zone there is a continual ascent of air, which, after rising, must spread itself to the north and south, in an opposite direction to the trade-winds below : these upper currents, becoming cooled above, at last descend and mix themselves with the lower air ; part of them may, perhaps, fall again into the trade-winds, and the remainder, pursuing its course towards the poles, occasion the north-west and south-west winds of which we have been speaking. It has also been conjectured that these winds may frequently be caused by a decomposition of the atmosphere towards the poles, from part of the air being at times converted into water.

HURRICANES.—Hurricanes have been supposed to be of electric origin. A large vacuum is suddenly created in the atmosphere, into which vacuum the surrounding air rushes with immense rapidity, sometimes from opposite points of the compass, spreading the most frightful devastation along its track, rooting up trees, and levelling houses with the ground. They are seldom experienced beyond the tropics, or nearer the equator than the 9°

or 10° of latitude ; and they rage with the greatest fury near the tropics, in the vicinity of land or islands, while far out in the open ocean they rarely occur. They are most common among the West India Islands, near the east coast of Madagascar, the islands of Mauritius and Bourbon, in the bay of Bengal at the changing of the monsoons, and on the coasts of China.

WHIRLWINDS.—Whirlwinds sometimes arise from winds blowing among lofty and precipitous mountains, the form of which influences their direction, and occasions gusts to descend with a spiral or whirling motion. They are frequently, however, caused by two winds meeting each other at an angle and then turning upon a centre. When two winds thus encounter one another, any cloud which happens to be between them is, of course, condensed and turned rapidly round ; and all substances sufficiently light are carried up into the air by the whirling motion which ensues.

WATER-SPOUTS.—The action of a whirlwind at sea occasions the curious phenomenon named a Water-spout, which is thus described by those who have witnessed it. From a dense cloud a cone descends in the form of a trumpet, with the small end downwards ; at the same time the surface of the sea under it is agitated and whirled round, the waters are separated into vapour, and ascend with a spiral motion till they unite with the cone proceeding from the cloud ; frequently, however, they disperse before the junction is effected. Both columns diminish towards their point of contract, where they are not above three or four feet in diameter. In the middle of the cone, forming the water-spout, there is a white transparent tube, which becomes less distinct on approaching it, and it is then discovered to be a vacant space in which none of the small particles of water ascend ; and in this, as well as around the outer edges of the water-spout, large drops of rain precipitate themselves. In calm weather, water-spouts generally preserve the perpendicular in their motion ; but, when acted on by the winds, they move on obliquely ; sometimes they disperse suddenly, at others they pass rapidly along the surface of the sea, and continue a quarter of an hour or more before they disappear. A notion has been entertained that they are very dangerous to shipping, owing to the descent, at the instant of their breaking, of a large body of water sufficient to sink a ship ; but this does not appear to be the case, for the water descends only in the form of heavy rain. It is true that small vessels incur a risk of being upset, if they carry much sail ; because sudden gusts of wind, from all points of the compass, are very common in the vicinity of water-spouts.

TIDES.

The tides proceed from the attractive forces of the sun and moon, which diminish the gravity of the waters of the ocean, or which is the same thing, draw or lift up the waters toward themselves.

The moon, on account of her nearness to our planet, has the most powerful effect upon the tides ; it is calculated that her influence is nearly triple that of the sun. The sun, however, acts upon the ocean in the same manner, though in a less degree. When these two bodies unite their influence, which they do at the seasons of new and full moon, the tides naturally rise the highest, and are then called spring tides ; but, when the moon is in her quadratures, or quarters, the action of each of the two luminaries is directly opposed to that of the other ; the tides are then, of course, the lowest, and are called neap tides. During the moon's circuit round the earth, the spring and neap tides each occur twice, and one after the other.

As the moon crosses the meridian of a place about every twenty-four hours fifty minutes and a half, the sea in that space of time ebbs and flows twice all over the world, although much less towards the poles than within the tropics, where the waters are under the direct line of the lunar attraction.

Were it not for the reasons hereinafter mentioned it would be high water, at any place in the open sea, when the moon is upon the meridian of that place, and low water when the moon is upon a circle, cutting the meridian in question at right angles; but, in fact, the greatest and least heights of the water at that a place do not occur till about three hours after. The delay is thus explained: the elevated parts of the sea have received such an impulse towards ascent, that they continue to rise after the earth's rotation has carried them from under the line of the direct attraction of the moon; this impulse being also aided for a time, by the moon continuing to attract the water upwards, though in a less degree.

If the earth were entirely covered by a sea of uniform depth, and the sun and moon moved always in the plane of the equator, the region of the highest tides would always be directly under the equator, while at the poles there would never be any tide whatever. But the changes that occur in the positions of the sun and moon, and several other circumstances, prevent the tides from taking place in so uniform a manner.

It must, at the same time, be kept in view, that, whenever the sun and moon are not situated at the same distances from the equator, so that the circles of their highest tides do not coincide, or fall together, allowance must be made for their attractive forces counteracting, in some degree, each other's effects upon the ocean; and as the moon completes her range, on each side of the equator, in about $29\frac{1}{2}$ days, while the sun, to complete his, takes nearly $365\frac{1}{4}$ days, their combined motions must produce continual irregularities in the tides. Taking one year with another, the mean monthly range of the moon, on each side of the equator, is the same as the annual range of the sun ($23^{\circ} 28'$); the highest tides are, consequently, within the tropics, and the least within the arctic and antarctic circles.* Within the tropics the flood tides pass from east to west (following the apparent course of the sun and moon) but, as the torrid zone is the seat of the highest tides, the flood in the northern temperate zone comes from the south, and in the southern temperate zone from the north. To this rule there are, nevertheless, local exceptions, caused by those derangements of the tide which we are now going to mention.

Of all irregularities in the tides, those are the greatest which are occasioned by the obstacles offered by the land to the ebb and flow of the waters. The impediments created by shallows in the ocean, and by the shores, bays, gulfs, and promontories of islands and continents are such, that the tides are greatly delayed, altered both in degree and in direction, and in many places so accumulated, that they rise to heights far exceeding what is witnessed in the open ocean. On the coasts of the islands of the South Sea, there are regular tides of only one or two feet in elevation; but, on

* It has been already stated that it is high water at any place twice in every 24 hours $50\frac{1}{2}$ minutes. When a place is on the same side of the equator as the moon, the tide, which is produced while the moon is above the horizon of the place, will exceed the tide which is produced while the moon is under the horizon of the place; but, when a place is on the opposite side of the equator to the moon, the effect is exactly the reverse. Thus, when the moon is north of the equator, a place under a parallel of north latitude will have its greatest high water when the moon is above the horizon; but a place under a parallel of south latitude will have its greatest high water when the moon is below the horizon. When the moon is south of the equator, these effects will be just reversed. In summer, when the sun's declination is considerably north, the afternoon tides, north of the equator, are higher than the morning tides; in winter the morning tides exceed those of the afternoon.

the western shores of Europe, and on the eastern shores of Asia, the tides are very strong, and have many variations. On the northern coasts of France, the flow being confined in a channel, and repelled also by the opposite coasts of England, rises to a surprising height,—at St. Maloes, in Bretagne, it is said, even to 50 feet. The tide of the German Ocean is twelve hours in travelling from the mouth of the Thames to London Bridge, where it arrives about the time that there is a new tide in the German Ocean. This is one instance, out of the many, of the effect produced upon the tide when it has to pass along a narrow channel, and to overcome an opposing current.

The explanation that has been given of the manner in which tides are created in the ocean, will enable us to perceive why it is that, in some gulfs and inland seas, there are either no tides, or such trifling ones as to be scarcely discernible. In small collections of water the moon acts with the same line of attraction, or nearly so, upon every portion of the surface at once, and, therefore, the whole of the waters being equally elevated at the same period, no part of them is ever higher than the other. This is one reason why the Baltic has no perceptible tides, and why even those of the Mediterranean are hardly visible.* But, in addition to this, the two seas in question are so circumstanced that they cannot receive tides from the Atlantic: 1st, because their entrances are not turned towards the main direction of the Atlantic tide; 2ndly, because their entrances are so narrow, that the quantity of tide which that ocean can, in a few hours, impel into them, is insufficient, after being spread over the extensive surfaces of the two seas, to raise their level at all perceptibly. The Greeks who accompanied Alexander the Great in his expedition to the East, having never been on any other coasts than those of the Mediterranean, were seized with complete consternation on first beholding the retreat of the strong tide which the Indian Ocean sends into the river Indus. In gulfs which are differently circumstanced with respect to the direction of their entrances, and which have openings wider, as compared with their extent, the tides propagated from the ocean are sensibly felt. Hudson's and Baffin's Bays, and the Red Sea, are examples which prove the correctness of this observation.

Currents and winds (especially the latter) have, according to their direction, an influence either in quickening or retarding the tide; indeed a powerful wind will sometimes keep a tide out of very narrow channels. On the contrary, a strong wind coming from the same quarter as the tide will raise it several feet above its usual level.

The causes which render the movements of the tides complex and irregular, may thus be summed up under four heads—1. The variations in the positions of the sun and moon, with respect to the equator and to each other; 2, the obstacles presented by the land; 3, by winds; and 4, by currents. The existence of these causes render it impossible to lay down any general rule for calculating the level, either of high or of low water, in different latitudes.

CURRENTS.

Currents in the ocean may be occasioned in various ways: they may arise from an external impulse (a gale of wind for instance); from a difference in

* The little tide which there is in the Mediterranean seems to be formed chiefly on the part extending to the east of Malta, and to proceed northward into the Gulf of Venice. M. D'Angos observed that, at Toulon, on the coast of France, the sea rose a foot, about $3\frac{1}{2}$ hours after the moon passed the meridian.

temperature or saltness between two parts of the sea; from the periodical melting of the polar ice, or from the inequality of the evaporation which the surface of the sea undergoes in different latitudes. These causes may produce constant or occasional currents, and, according as they act in concert or in opposition, will their effects be various.

The most remarkable currents are those which continually follow the same direction. There is one which sets regularly from each of the poles towards the equator; and when we get within 28° or 30° of the line on either side, a general movement is observed in the ocean, in a direction nearly from east to west. The existence of the two polar currents is proved by the floating of masses of ice from the frigid into the temperate regions: these masses are, at times, seen as low as the 45° , or even the 40° , of latitude.

It was the opposition of the polar current which principally occasioned the failure of the attempt made by Captain Parry to reach the north pole; before they desisted from their efforts, the expedition found that, as they advanced over the ice, they were being drifted southward, at a rate faster than that at which they were travelling northward. It is equally certain that a tropical current exists. Judging not only from the direction of bodies floating on the water, but also from the circumstance that vessels, in crossing from Europe to America, descend to the latitude of the Canary Islands, where they fall into a current and are carried rapidly to the west. In going from America to Asia, across the Pacific, a similar effect is observed. It might be supposed that this was due solely to the trade-winds, but such is not the case; for it is quite possible to distinguish their effect from that of the currents, since the progress of the vessel is quicker than it could be with the aid of the wind alone.

The origin of the polar currents is, no doubt, in great measure, to be referred to the centrifugal force which is the result of the earth's rotation. It may be further explained, when we reflect that the water towards the poles, both on account of its lower temperature and its being less attracted by the heavenly bodies, is heavier than the water in the tropical regions, and, moreover, that the heat of the torrid zone occasions a much more powerful evaporation of the sea than is elsewhere experienced: the consequence is, that the waters nearer the poles will move towards the equator, in order to restore the equilibrium which has, in these several ways, been destroyed. The tropical current may also, in another manner, be explained as proceeding from the earth's rotation. The waters, as they advance from the polar seas, pass from regions where the rotatory motion of the earth's surface is very slight, to those where it is exceedingly rapid; they cannot immediately acquire the rapid motion with which the solid parts of the earth revolve in the tropical regions, and they are, accordingly, left rather behind, that is to the westward (the earth turning round from west to east). The ocean, consequently, appears to retreat from the western, and advance upon the eastern coasts of the continents, or, in other words, to have a general movement from east to west; and the effect is very much assisted by the constant blowing of the trade-winds.

We will now explain the modifications, or changes, which this grand movement in the ocean undergoes, in consequence of the obstacles presented by the land to its free progress. When it meets with shores or narrow straits to impede or turn aside its course, it forms strong and even dangerous currents. The eastern coast of America, and the West India Islands, constitute a sort of dyke to the general westward motion of the Atlantic; and it will be seen, if we refer to a map, that from Cape St. Roque, in about 5° south latitude, the coast of South America stretches away in a continued line

to the north-west, as far as the Isle of Trinidad. Owing to this shape of the coast the waters, as far as 10° south, are, when they approach America, carried away in a current to the north-west. This current afterwards enters the Gulf of Mexico, through the strait formed by the western end of Cuba and the opposite peninsula (from this part it is called by navigators, the Gulf Stream), and follows the bendings of the Mexican coast, from Vera Cruz to the mouth of the Rio del Norte, and thence to the mouths of the Mississippi, and the shoals west of the southern extremity of Florida. It next takes a new direction to the north, and rushes impetuously into the Gulf of Florida. M. Humboldt observed in the month of May, 1804, in the 26° and 27° of latitude, that its velocity was 80 miles in 24 hours, although, at the time, there was a violent wind against it.

At the end of the Gulf of Florida (north latitude 28°) it runs to the north-east, at the rate, sometimes, of 5 miles an hour. It may always be distinguished by the high temperature* and saltness of its waters, their indigo-blue colour, and the quantity of sea-weed floating on the surface, and also by the heat of the surrounding atmosphere. The rapidity and temperature of the Gulf Stream diminish towards the north, while, at the same time, its breath increases.† Its further progress northward is at last checked by the southern extremity of the Great Bank of Newfoundland, in 42° N., where it turns suddenly to the east. It afterwards continues moving towards the E. and the E.S.E. as far as the Azores; and thence it turns towards the Straits of Gibraltar, the Isle of Madeira, and the group of the Canaries, till, on reaching the parallel of Cape Blanco, it completes the round by mixing with the grand westerly current of the tropics. It is probable, however, that a branch still keeps on its course to the south and south-east, along the coast of Africa: and it is well known that ships, if they approach too near the shore, are drawn into the Gulf of Guinea, and with difficulty get out again. We thus see that between the parallels of 11° and 43° , the waters of the Atlantic are carried on in a continual whirlpool. Humboldt remarks that, "Supposing a particle of water to return to the same place from which it departed, we can estimate, from our present knowledge of the swiftness of currents, that this circuit of 3800 leagues is not terminated in less than two years and ten months. A boat, which may be supposed to receive no impulse from the winds, would require thirteen months, from the Canary Islands, to reach the coast of Caraccas; ten months to make the tour of the Gulf of Mexico and reach Tortoise Shoals, opposite the port of the Havannah; while forty or fifty days might be sufficient to carry it from the Straits of Florida to the Bank of Newfoundland. It would be difficult to fix the rapidity of the retrograde current from this bank to the coasts of Africa: estimating the mean velocity of the waters at 7 or 8 miles in 24 hours, we find ten or eleven months for this last distance." It is a curious fact, that towards the close of the fifteenth century, before Europeans were acquainted with the existence of America, two bodies, belonging to an unknown race of men, were cast, by the Gulf-stream, on the coasts of the Azores, and pieces of bamboo were brought, by the same current, to the shore of the island of Porto Santo; by these

* Humboldt observes that "The waters of the Mexican Gulf, forcibly drawn to the north-east, preserve their warm temperature to such a point, that at 40° and 41° of latitude, he found them at $72\frac{1}{2}^{\circ}$ (Fahrenheit); when out of the current, the heat of the ocean, at its surface, was scarcely $63\frac{1}{2}^{\circ}$. In the parallel of New York (41° N.) the temperature of the Gulf Stream is, consequently, equal to that of the seas of the tropics in the 18° of latitude."

† Its breadth in latitude $28\frac{1}{2}^{\circ}$ is seventeen leagues (3.46 miles to a league); in the parallel of Charles Town (33° nearly) from 40 to 60 leagues; and on the meridian of Corvo and Flores, the westernmost of the Azore Islands, it is 160 leagues.

circumstances, Columbus is said to have been strengthened in his conjectures with respect to the existence of a Western Continent.

An arm of the Gulf-stream, in the 45° and 50° of latitude, runs to the north-east, towards the coasts of Europe, and becomes very strong when the wind has blown long from the west. The fruit of trees, which belong to the American torrid zone, is, every year, deposited on the western coasts of Ireland and Norway; and on the shores of the Hebrides are collected seeds of several plants, the growth of Jamaica, Cuba, and the neighbouring continent. The most striking circumstance, perhaps, is that of the wreck of an English vessel, burnt near Jamaica, having been found on the coast of Scotland.

There are various currents in the Pacific and Indian Oceans. The general westward motion of the former is impeded by a numerous archipelago, and hence it receives different directions. A strong current sets to the west through each of the two straits, which respectively separate New Holland from New Guinea and from Van Dieman's Land. It then gets diverted, and flows northward, along the bottom of the coast of Sumatra, till it reaches the Bay of Bengal. The following appears to be the reason of its taking this course:—The general impetus of the Pacific towards the west, being encountered by New Holland and the numerous East India isles, is broken and dispersed; while the westerly motion of the Indian sea has not, in so early a stage, acquired much strength; the polar current, from the south, at the same time presses upon the wide opening which the Indian sea presents to that quarter, and the waters on the eastern verge of that sea are, therefore, pushed into the Bay of Bengal. In the neighbourhood of Ceylon and the Maldivé Islands, however, the tropical motion has become powerful enough to resist the polar current. The westerly current then recommences, but is again turned out of its line, and made to flow to the south-west, by the chain of islands and shallows which reaches from the extremity of the Indian peninsula to Madagascar. After passing Madagascar, it dashes against Africa, and, at the termination of that continent, mingles with the general motion of the waters.

A current afterwards sweeps from the Atlantic into the Pacific Ocean through the Straits of Magalhaen. There can be little doubt that this is a branch of the general current from the south pole; though, at the same time, it may be partly the result of the westerly movement of the Atlantic, which being checked by the shores of Brazil, flows to the south-west, along the South American coast.

There is a question connected with the currents of the Arctic Ocean, which has engaged a good deal of attention, and been considered difficult to explain: it is from what quarters the timber can come, which is found floating on the polar seas, in such large quantities, and so much of which is thrown ashore on the northern side of Iceland.* The few specimens seen of the growth of Mexico and Brazil must have travelled to the north, by means of the Gulf-stream, of which we have spoken; the rest (principally pines and firs) most likely comes from Siberia and North America, along the shores of which it is drifted till it arrives at the opening into the Atlantic, in the midst of which Iceland is placed.

The existence of under currents different from, and even opposite in their direction to, those on the surface, is, by no means improbable, in some cases,

* From the account which Captain Parry has given of his voyage, it appears that there is also a great quantity of timber, which has been cast by the sea upon the northern coast of Spitzbergen.

though it is a matter not admitting proof. It has been thought that the Mediterranean, which has a strong flow always setting into it through the Straits of Gibraltar, sends back a portion of its waters into the Atlantic, by a concealed current. Contrary currents, passing along side by side, are not uncommon. In the Cattegat a northern current flows out of the Baltic, along the coast of Sweden, while a southern one enters the Baltic along the coast of Denmark. When two opposite currents, of about equal force, meet one another, they sometimes, especially in narrow channels, turn upon a centre, and assume a spiral form, giving rise to eddies or whirlpools. The most celebrated of these are the Euripus, near the island of Euboea, in the Grecian Archipelago; Charybdis, in the strait between Italy and Sicily; and the Maelstrom, off the coast of Norway. The most violent of them, when agitated by tides or winds, become very dangerous to navigation.

ON THE OCEAN—ITS SALTNESS AND TEMPERATURE.

That vast body of water which surrounds the continents, and is the common receptacle of their running waters, is indispensably necessary to the support of animal and vegetable existence upon the earth. Its perpetual agitations purify the air, and the vapours, which the atmosphere draws up from its surface, being condensed and dispersed through the upper regions, form clouds, which are the source of a constant supply of rain and moisture to the land. The ocean also, by the facilities for communication which it offers, is the means of uniting the most distant nations, while it enables them to interchange, with mutual advantage, the productions of their several climates.

The bottom of the sea appears to have similar inequalities to the surface of the continents; the depth of the water is, therefore, extremely various. There are vast spaces where no bottom has been found; but this, of course, does not prove that the sea is bottomless, because the line is able to reach but a comparatively small depth. Lord Mulgrave, in the Northern Ocean, let down a very heavy sounding lead, and gave out with it nearly 4,700 feet of rope without finding the bottom; and Mr. Scoresby mentions having sounded in the Greenland sea as much as 7,200 feet. Such experiments, however, must be of very doubtful character; it is well known how much more easily bodies may be moved along in the water than in the atmosphere, and, consequently, any current would be sufficient to carry the lead with it, and so draw the rope out of a perpendicular direction. If we were to found our opinion upon analogy, we might conclude that the greatest depth of the ocean is, at least, equal to the height of the loftiest mountains, that is, between 20,000 and 30,000 feet.

The level of the sea, if it were not for the action of external causes, would be the same everywhere at the same instant, owing to the equal pressure exerted by the particles of a fluid upon each other in every direction. The figure assumed by the ocean would, therefore, exhibit the true surface of our planet, that of an oblate spheroid. But it is evident that no general level of this kind can ever exist, because the tide at any given moment is at very different heights in different parts of the ocean. The level is also continually being disturbed by the operation of the winds in particular regions. Independent, however, of these circumstances, it would appear that in gulfs and inland seas, which have only a slight communication with the ocean, the level

of the water is usually more elevated than in the latter. This seems to be more especially the case if the only openings of these gulfs are towards the east; and it is attributed with reason to the accumulation which arises from the water being driven into these confined inlets by the general movement to which allusion will be made presently. When the French engineers were in Egypt, they made observations, according to which the waters of the Red Sea, on the east side of the Isthmus of Suez, were $32\frac{1}{2}$ feet higher than those of the Mediterranean, on the opposite shore of the same isthmus. M. Humboldt made observations of a similar kind upon the Isthmus of Panama, and his conclusion is, that the waters of the Gulf of Mexico are from 20 to 23 feet higher than those of the Pacific on the other side. Of certain inland seas the level varies with the seasons; the Baltic and the Black Sea, which are in fact almost lakes, swell in the spring, from the abundance of water brought down to them at that period by the rivers.

The general colour of the sea is a deep bluish green, which becomes clearer towards the coasts. This colour is thought to arise entirely from the same cause as the azure tint of the sky; the rays of blue light, being the most refrangible, pass in the greatest quantity through the water, which, on account of its density and depth, makes them undergo a strong refraction. The other colours exhibited in parts of the sea depend on causes which are local, and sometimes deceptive. The Mediterranean, in its upper part, is said to have, at times, a purple tint. In the Gulf of Guinea the sea is white; around the Moldavia Islands it is black; and in some places it has been observed to be red. These appearances are probably occasioned by vast numbers of minute marine insects, by the nature of the soil, or by the infusion of certain earthy substances in the water. The green and yellow shades of the sea proceed, frequently, from the existence of marine vegetables at or near the surface.

The water of the sea contains several extraneous substances, in proportions varying in different places. The component parts, in addition to pure water, are commonly muriatic or marine acid, sulphuric acid (vitrol), fixed mineral alkali, magnesia, and sulphurated lime. By boiling, or evaporation in the air, common salt (muriate of soda) is obtained, which for salting meat is preferred to the salt of springs. The saltiness of the sea appears, with some local exceptions, to be less towards the poles than near the tropics; but the difference is very slight, and perhaps the observations made are not sufficiently numerous to justify any positive general conclusions. Some observations which have been made tend to prove that the sea is less salt at the surface than towards the bottom.

The degree of saltiness, in particular parts of the sea, frequently varies from temporary causes. The violent tropical rains have an effect in diminishing it, especially near coasts, where an increased volume of fresh water is brought down by the rivers. The Baltic is, at all times, less salt than the ocean, and, when a strong east wind keeps out the North Sea, its waters are said to become almost fit for domestic uses. The most curious phenomenon of all is that of springs of fresh water rising up in the midst of the sea; Humboldt mentions that in the Bay of Xagua, on the southern coast of Cuba,—springs of this kind gush up with great force at the distance of two or three miles from the land.

The bitterness which exists in sea water, but apparently not beyond a certain depth, is, with much probability, considered to be owing to the vegetable and animal matter held there in a state of decomposition.

Water being a bad conductor of heat, the temperature of the sea changes

much less suddenly than that of the atmosphere, and is by no means subject to such extremes as the latter.* It may safely be affirmed that the temperature never, in any season, or under any latitude, exceeds 85° or 86° of Fahrenheit. The existence of banks or shallows has a local effect in diminishing the temperature of the ocean, but the great agents in modifying it are currents, which mingle together the waters of different depths and regions. Thus the Gulf Stream, as it is termed, which sets into the Gulf of Mexico, is much warmer than the neighbouring parts of the sea : the current of Chili is just the reverse.

TABLES OF THE TEMPERATURE OF THE ATLANTIC OCEAN,
IN DIFFERENT DEGREES OF LONGITUDE.

No. 1

Latitude.	Longitude.	Temperature at the Surface.	Period of the Observation.	Observers.	
39° 10' N.	16° 18' W.	59° 00' Fahr.	Between June 9th and July 15th, 1799.	Humboldt.	These experiments were made during a passage from Spain to the New Continent.
34 30	16 55	61 34			
32 16	17 4	63 86			
30 36	16 54	65 48			
29 18	16 40	66 74			
26 51	19 13	68 00			
20 8	28 51	70 16			
17 57	33 14	72 32			
14 57	44 40	74 66			
18 51	49 43	76 46			
10 46	60 54	78 44			

* The effect of the sea is to equalize temperature, so that a maritime country is not liable to such extremes, either of heat or cold, as an inland one. The sea itself being of a very equable temperature, the winds which pass over an extent of it partakes somewhat of the same character. When a cold wind passes over sea it receives part of the warmth of the water, the upper particles of which being thus rendered cooler, and consequently heavier than those below, descend and are succeeded by warmer particles ; so that there is a continual tendency in the sea to temper a cold wind passing over its surface. A cold wind, blowing overland, is at first rendered warmer by the earth's surface ; but this surface quickly becoming cooled, ceases to have any effect upon the wind, which, therefore, travels on with undiminished rigour. Again, a warm wind in passing over the sea, is cooled by the agitation which it produces, bringing up cooler water from below, as well as by the constant evaporation which it occasions : the surface of the water also cannot, as that of the land, be powerfully heated by the sun's rays, because it affords them a free passage, and therefore it cannot communicate heat to the atmosphere in the degree which the land does. From these circumstances it results that, though a place situated inland and another upon the coast may have the same mean annual temperature, the range of the thermometer at each will be very different; the summers of the latter will be cooler, and the winters milder than those of the former. It is from this cause that islands are so much more temperate than continents. It follows, too, that countries in our hemisphere will be rendered warmer by having large tracts of land to the south, and sea to the north ; and cooler when the relative position of these two is reversed. This fact is exemplified by a comparison of the climate of India with that of Africa, north of the equator, the heats of the former country being much more supportable than those of the latter. Not only the temperature of a wind, but also its degree of moisture, depends upon the nature of the surface over which it passes. A wind coming up from the ocean is loaded with vapours, but one sweeping over an extent of land is rendered dry and parching. This explains to us why, in our own island, a south-west and an easterly wind are so opposite in character.

No. 2.

Latitude.	Longitude.	Temperature of the Ocean.	Period of the Observation.	Observers.	Mean Temperature of the Air in the Ba- son of the Sea.
0° 58' S.	27° 34' W.	80. 96' Fahr.	Nov., 1788	Churruca	80° 6' (Cook)
0 57	30 11	81 86	April, 1803	Quevedo	
0 33	21 20	81 86	March, 1800	Perrins	
0 11 N.	84 15	82 40	Feb., 1803	Humboldt	
0 13	51 42 E.	80 78	May, 1800	Perrins	
25 15 N.	20 36 W.	68 00	June, 1799	Humboldt	69° 8' (La Perouse and Dalrymple.)
25 29	39 54	70 88	April, 1803	Quevedo	
25 49	26 20	69 26	March, 1800	Perrins	
27 40	17 4	70 88	Jan., 1768	Chappe	
28 47	18 17	74 30	Oct., 1788	Churruca	
42 34 N.	15 45 W.	51 98	Feb., 1800	Perrins	54° 86' (Cook and d'Entrecasteaux)
43 17	31 27	50 90	May, 1803	Quevedo	
43 58	13 7	60 62	June, 1799	Humboldt	
44 58	34 47	54 86	Dec., 1789	Williams	
45 18	4 40	59 90	Nov., 1776	Franklin	
48 11	14 18	57 74	June, 1790	Williams	

These tables refer only to the Atlantic ocean ; but the experiments which have been made in the South sea, and in the Indian ocean, show that, within a certain distance of the equator, the general temperature of the sea follows nearly the same rule in corresponding latitudes. Within the tropics there is no sensible difference in north and south latitudes ; there is very little even as far as 35° and 40° ; but, when we advance into high latitudes, there can be no doubt that the sea is colder in the southern than in the northern hemisphere. Ice extends from five to eight degrees of latitude farther from the south than from the north pole, owing, it is probable, to the almost entire absence of land near the Antarctic circle ; while the north pole is so nearly surrounded by land, that the ice of the Arctic ocean is shut up, and cannot be carried forward to such a distance by the current which sets towards the equator.

Bays, inland seas, and the spaces among clusters of islands, where the action of the waves is more confined, and the water usually of less depth, are the most favourable places for the production and accumulation of the marine ice. It is on this account that the navigation of the Baltic is annually stopped by the ice, in a latitude not more northerly than that of the tracts which, in the main ocean, are always open to the passage of ships. In severe winters, people may travel in sledges across the entrance of the Gulf of Bothnia (latitude 60°) which, including the numerous small intervening islands, is a distance of 115 miles. The body of ice accumulated in Lancaster's Sound has defied all the attempts that have been made to accomplish the north-west passage from the Atlantic to the Pacific.

The ice of the polar seas assumes a great variety of shapes and appearances. The vast and thick sheets, which are met in the high latitudes, are called fields by navigators ; they are so extensive that their boundaries cannot be seen from a ship's mast-head ; and Captain Cook found a chain of them joining Eastern Asia to North America : sheets of less extent than fields are called floes. Bergs are islands of ice, considerably elevated above the water ; and, though of the most varied forms, commonly perpendicular on one side, and sloping gradually down on the other—in height they are sometimes 22

much as 200 feet. There are two ways of explaining the formation of these bodies. The large masses of ice in the Polar seas, when crowded together by winds and currents, exert such an enormous pressure upon each other, that they are frequently broken, and the fragments are piled up so as to form mounds and ridges of considerable elevation; it is thus that many of the small icebergs originate. There is no doubt, however, that the most bulky of these bodies are detached portions of vast glaciers, such as abound on the precipitous coasts of Greenland and Spitzbergen, broken off in consequence either of their own weight, or the undermining actions of the waves, and then carried by winds and currents to other parts of the ocean.

When the summer has well advanced, the masses of ice, which have been frozen together during the winter, gradually separate, and clear spaces of water are left. As soon as the end of September, these open spaces again begin to freeze over; and, before this effect commences, the temperature of the air must be very much lowered, owing partly to the freezing point of sea being $3\frac{1}{4}^{\circ}$ (Fahrenheit) below that of common water, but more especially to the surface which the water presents to the atmosphere being repeatedly changed, before its temperature is sufficiently reduced for it to freeze. This change in the surface, which is greatly assisted by the agitation of the sea, takes place in consequence of the particles of a liquid body becoming specifically heavier as they get cooled, so that they descend and are succeeded by warmer particles.

There are three kinds of movements constantly going on in the waters of the sea:—1. The agitations which its surface undergoes by the action of winds.—2. Tides, which are the result of the attraction exercised on the water by the sun and moon.—3. Currents, which arise from different causes some of them existing within the element itself. As the particles of a fluid press equally in every direction, it follows that when a portion of the surface of the water is displaced by wind, the adjoining water instantly rushes in to restore the equilibrium or balance which has been destroyed: this accounts for the formation of waves. When a violent impulse has been communicated, the waves continue in motion for some hours after the gale has entirely subsided, on the same principle as a pendulum continues to swing for some time after it has been set in action. Yet the agitation occasioned by winds extends to comparatively but a little way below the surface of the water; divers say that, in the roughest weather, it is calm at the depth of 90 feet.

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If the register tonnage of a vessel denoted the actual capacity of the vessel in measurement tons of 40 cubic feet, or had any fixed proportion to that capacity, it would be easy to calculate the quantity of goods, of any specified kind, which the vessel would carry. But, as the present mode of measuring vessels is defective, the register tonnage is not a certain guide to ascertain the quantity of cargo which a vessel can carry, as much depends on the peculiar build of the vessel.

A good carrying vessel will carry one-half more tons than her register tonnage; and on this principal the quantity of cargo may be ascertained, as in Article 59.

The only correct mode of ascertaining the quantity of cargo which a vessel can carry, is to ascertain practically the quantity of dead weight which the vessel can take as a complete cargo: say the number of tons of coals. Also, ascertain practically the number of measurement goods the vessel can stow; which will give the contents of the vessel in tons of 40 cubic feet. With these data, the quantity of any specified kind of goods, which a vessel can take as a complete cargo may be calculated as in Articles 60, 61, 62, and 63.

The mode of making these calculations by means of Logarithms is given in Article 64.

In chartering vessels, it is often the case that a certain rate of freight is stated for a specified kind of goods; and should the vessel be loaded with any other kind of goods, the Charterparty stipulates that a proportionate rate of freight will be paid. It is, therefore, of the utmost importance to the shipowner or shipmaster to know what the exact proportionate rates of freight of different kinds of goods should be, in order that he may be certain that he will earn the amount of freight which he expects. This is found by means of Tables 1, 2, or 3. See Articles 67 and 87.

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The Tables in the present work will, therefore, enable shipowners and shipmasters to guard against the loss which they may incur by signing open Charterparties, as it gives them the exact proportionate rates of goods, which, if adopted, will make the amount of freight earned the same, whatever goods are taken as cargo.

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The definitions peculiar to the part of *Navigation* are followed, in their order, by brief and comprehensive directions for resolving the different kinds of Sailing; and those peculiar to *Nautical Astronomy* are in like manner followed by rules for adjusting the angular instruments, such as the *quadrant* and *sextant*, and also by rules for taking the observations that are necessary for ascertaining the ship's place by means of the heavenly bodies; but this latter part of the subject may be better acquired through the assistance of a practical observer, than by means of any written instructions that can be given.

In the next place, there are given very concise and simple methods of finding the latitude by means of the meridian altitude of the sun, the moon, the planets, and the stars, and also by the altitude of the pole star, observed at any particular time.

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